THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
May 2, 1988 · Vol. XXII · No. 18 · 114 Pages · $2/Copy · $44/Year

COMPUTERWORLD

INSIDE

Executive Report — Save time and money with EDI. **Page 53.**

In Depth — Department-level publishing: Who's the boss? **Page 61.**

Spring in Atlanta: Comdex product preview. Pages 96, 97.

Whip in hand, Frank King stands ready to straighten out product lags at Lotus. Page 4.

Is ESA nirvana for DB2 users or the carrot needed to sell the 3090E series? Page 8.

Stratus raises transaction stakes with Sybase-based relational DBMS. Page 6.

Cassoni's return to Olivetti comes at inopportune time for AT&T's computer business. Page 69.

Apple's Hypercard slow to catch on in corporate market. Page 33.

Novell ready to add SQL to its bag of connectivity tricks. Page 8.

Paperless office still the goal of IBM's insurance customers. Page 10.

GM factories committed to earlier version of MAP. Page 6.

Reaching out to Kremlin PC users. Page 2.

Dual-bus clone built

Support for both PS/2 and AT cards pledged

BY JAMES A. MARTIN
CW STAFF

EVERETT, Mass. — Microdirect, Inc., a little-known PC vendor, is hoping to make a big splash at Comdex/Spring '88 with an industry first — an Intel Corp. 80386-based microcomputer compatible with both IBM PS/2 Micro Channel and Personal Computer AT buses.

Microdirect's 386 system, slated to be formally unveiled at Comdex next week and shipped in July, was designed to bridge the gap between the PC AT and the PS/2 as well as significantly increase I/O speeds through an

Continued on page 97

Cullinet layoff wave imminent

BY ROSEMARY HAMILTON and NELL MARGOLIS
CW STAFF

WESTWOOD, Mass. — The guillotine is set to fall today at Cullinet Software, Inc.

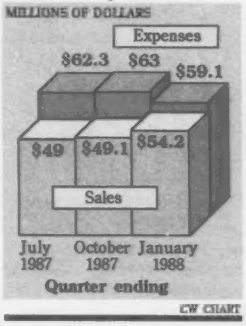
Although the company offered an official "no comment" and officers declined to return phone calls, a reliable source within Cullinet confirmed that a major layoff of hundreds of employees and several executive departures will be announced this morning along with other belt-tightening measures.

And while industry analysts said this is a necessary move that Cullinet must make to return to profitability, it appears not to be the only problem Cullinet must address. The Cullinet source confirmed last week that a number of products scheduled for release this year have been delayed. However, the delays are believed to involve new releases of existing applications and do not represent serious problems.

The Cullinet source said the company will notify analysts today of a "major restructuring within the company, including some new key vice-presidents." He said at least two executives will resign, including James Pitts, an appointee of former Chairman David Chapman who served as executive vice-president of finance and administration, and David Ireland, senior vice-president of customer support.

The announcement will also include a description of the personnel cutback, which is expected to affect between 400 and 500 people, observers said.

Adding it up
Expenses that continue to outpace sales are expected to prompt drastic action by Cullinet



CW CHART

Long time coming

"This is what should have been done in 1985 or 1986," said Charlotte Walker, a vice-president at County Securities Corp. "They tried to maintain capacity while redoing their product line. They should have immediately cut back."

Industry observers said Cullinet may also sell off smaller segments that are not central to the company's business and postpone some development efforts.

Company officials have long maintained Cullinet's high-profile new business segments, such as its banking software and its still-undefined relationship with Digital Equipment Corp., would not be axed. Industry speculation has pointed to at least two segments that may be sliced out of the picture — the Computer

Continued on page 8

Gene Amdahl returns

Leads third mainframe start-up, targets 3090

BY J. A. SAVAGE
CW STAFF

CUPERTINO, Calif. — Gene Amdahl says his golf game is not good enough to keep him away from the computer business. So by next year, he says, he will be ready to take another swing at IBM's mainframe market with a start-up, Andor Systems, Inc.

Amdahl, associated with one of the greatest successes as well as one of the most spectacular failures in mainframe computing, has been working nights and weekends with his eight-person staff to design a machine to compete most directly with IBM's 3090 Model 150.

This is the third attempt by Amdahl, who was one of the key architects of IBM's 360 system in the 1960s, to wrest IBM's vise grip off some of the mainframe market. He hopes to emulate the success he experienced founding mainframe manufacturer Amdahl Corp. in the 1970s rather than the fiasco of the later Trilogy Systems Corp.

Gene Amdahl

Amdahl said the as-yet-nameless computer will run between 7.5 and 10 million instructions per second using IBM's MVS, will cost very little to manufacture and will be priced about 15% less than the 3090.

The computer, which Amdahl jokingly refers to as "K2" (a mountainous allusion to the "Summit" code name of IBM's next mainframe generation), will be only about 24 by 24 in. and shallow.

"You want the base to be broad enough so it won't tip over, of course," Amdahl said.

Continued on page 16

True compatibility

BY KATHY CHIN LEONG
CW STAFF

He was the director of information systems at Morton Thiokol, Inc. She, the director of systems development at Avon Products, Inc.

And, building on a common love of technology and systems strategy, an MIS romance was ignited — nearly eight years ago in Palm Springs, Calif., at a Diebold, Inc. conference for information systems directors.

"We met over dinner with a group of people from the seminar, and we found that we had a lot of similar interests," recalls John Hammitt, now vice-president of information systems management at Pillsbury Co.

"There was just that immediate rapport, a sense of feeling at ease and comfortable," concurs his wife, Joanne Pisani. During the next three years, Hammitt and Pisani, now an MIS consultant at Coopers & Lybrand, courted and corresponded from their respective homes in Chicago and New York. They were married in 1983 and now live in Minneapolis.

Who says love and technology don't mix? It is fairly common for people in the same profession to meet each other

Continued on page 95

NEWSPAPER
**********5-DIGIT 48106
CW 17952639 803010285F71
J BROWN DIR
UNIV MICROFILMS INTERNATL
300 N ZEEB RD
ANN ARBOR MI 48106

SECOND CLASS

IN THIS ISSUE

Stress factor. Stratus, Sybase unite OLTP technologies and bear the SQL/2000 relational DBMS, which is among the jointly developed products some expect will cause headaches for Tandem today, DEC tomorrow. Page 6.

Net profits. 3Com introduces 3+SNA, saying it provides a gateway between IBM PC and PS/2 users on a 3+ network and host systems in an SNA environment. Page 14.

NEWS

4 King takes Lotus throne, promises "discipline."

4 Wang blasts off into PC LAN market.

6 GM gears up to implement early MAP version.

6 DEC readies Decintact for transaction processing.

8 DB2 upgrade involves substantial expenses.

8 Microsoft readies new Mac software, despite Apple legal battle.

8 Novell gears up to add SQL to its OS/2 connectivity products.

10 Insurance users anxious to move toward paperless office.

14 Blumenthal says Unisys will devote majority of R&D budget to net manager.

16 Sen. Lautenberg, ADP cofounder, announces bid for re-election.

16 Prime reports solid first-quarter earnings and high-end sales slowdown.

95 Sacrifice plays role in two-career couples' lifestyles.

96 Comdex/Spring draws include socializing, reunions.

96 Communications rollouts expected to run the gamut at Comdex.

96 IBM PC-compatible systems among anticipated Comdex rollouts.

97 Desktop publishing to make impact at Comdex show.

97 Comdex goers might be hard-pressed to find OS/2-specific software.

SOFTWARE & SERVICES

23 Federal Programmers Workbench founder Harrison resigns.

23 Mindover MVS assists MVS troubleshooters.

23 MSA refines product lines.

Speed transactions with EDI. Page 53.

MICROCOMPUTING

29 Lotus's CD/Corporate plays some new tunes.

29 Piecemeal purchasing no way to build a laptop.

NETWORKING

39 Tymnet's Fenn steers firm through shifting user environment.

39 EDI: Users think they need it.

39 Network managers look in-house for maintenance, support.

SYSTEMS & PERIPHERALS

47 "Unix University" relies on MVS.

47 New Prime EXLs pack 4- to 5-MIPS punch.

47 Masscomp replaces product line with four 68030-based systems.

Quotable

"We will be a mosquito on the side of IBM. But we hope to be one that's satiated with blood."

GENE AMDAHL
ANDOR CORP.

See story page 1.

MANAGEMENT

65 Wheels are turning at Schwinn, thanks to Walsh.

65 California smog fuels telecommuting plans.

COMPUTER INDUSTRY

69 Foreign sales buoy Compaq earnings, do little for mini makers.

69 Micom cancels plans for stock buy-back, eyes acquisition offers.

69 AT&T taps Kavner; Cassoni goes back to Olivetti.

COMPUTER CAREERS

74 Circumstance plays role in consultants' education.

TRENDS

98 Electronic mail use expected to grow through the century.

EXECUTIVE REPORT

53 EDI users boast cost savings, fewer errors when sending purchase orders and invoices electronically. By Lawrence Stevens.

IN DEPTH

61 The latest little item proliferating outside MIS's control: electronic publishing. By Alan Radding.

OPINION & ANALYSIS

19 Kirkley gets SIC in the data center.

23 Bozman swallows a DB2 time-release capsule.

29 Scannell takes Microsoft's pulse and doesn't hear Unix.

39 Adrian searches for a common idiom.

47 Mallach is not ready to abandon chip.

65 Connolly calls MIS managers on mistrial.

69 Wilder wonders if lessors can swim.

DEPARTMENTS

18 Editorial

86 Marketplace

98 Inside Lines

Glasnost eases high-tech move into Soviet Union

BY CLINTON WILDER
CW STAFF

FRAMINGHAM, Mass. — The world's largest nation has never been noted for computer use, but this is rapidly changing under Soviet Union leader Mikhail Gorbachev's *glasnost* economic policies.

The easing of government control under *glasnost* has allowed computers to gain some momentum in the USSR, according to Eugene N. Salnicov, director of Moscow-based Radio I Sviaz Publishers. Last week, Salnicov signed an agreement here with IDG Communications, Inc. to jointly publish the USSR's first computer magazine, *PC World USSR*.

IDG Communications is a publishing group that includes *Computerworld*, *PC World*, *Infoworld* and more than 100 computer-related publications in 36 countries.

'Indirect consequence'

"When we didn't have *glasnost*, we still had new technology," Salnicov said through an interpreter. "But the new economic theory means easier introduction of new technology. It has been an indirect consequence."

In addition to sparking interest in personal computers, *glasnost* paved the way for *PC World USSR* by granting Soviet publishing houses autonomy over what they can report.

Soviet government representatives are members of Radio I Sviaz's editorial group, and Salnicov was accompanied on his U.S. tour by a representative of the USSR State Committee for Publishing. But Radio I Sviaz does not rely solely on government information. "We can collect information from all over society," Salnicov said. "The main thing is that it should be reliable and interesting information. We must assure the accuracy of the information."

Salnicov said the Gorbachev government has been emphasizing the increasing use of computers. There are about 100,000 PCs in the USSR, about 20,000 of those in Moscow, according to the Soviet Embassy in Washington, D.C. Many are IBM machines, and IBM maintains a Moscow office.

Starting as a quarterly publication and debuting next month, *PC World USSR* will cover the use of microcomputers in education, government and trade. Articles will focus on new technology developments in the USSR and overseas.

IBM devises U.S., Europe data transfer

BY PATRICIA KEEFE
CW STAFF

RYE BROOK, N.Y. — IBM said last week it is now offering international network services said to enable customers in the U.S. and 12 European countries to exchange interactive data for the first time with their trading partners.

The services are part of the Intercontinental Information Services product family and will be made available via IBM's Information Network, a commercial value-added network. IBM already offers electronic messaging and batch data transferring to more than 50 countries.

Reportedly, the services allow Information Network users to exchange business information, such as electronic mail, and electronic data interchange-based forms, such as orders, invoices and shipping notices. In addition, users gain access to online data bases and applications, IBM said.

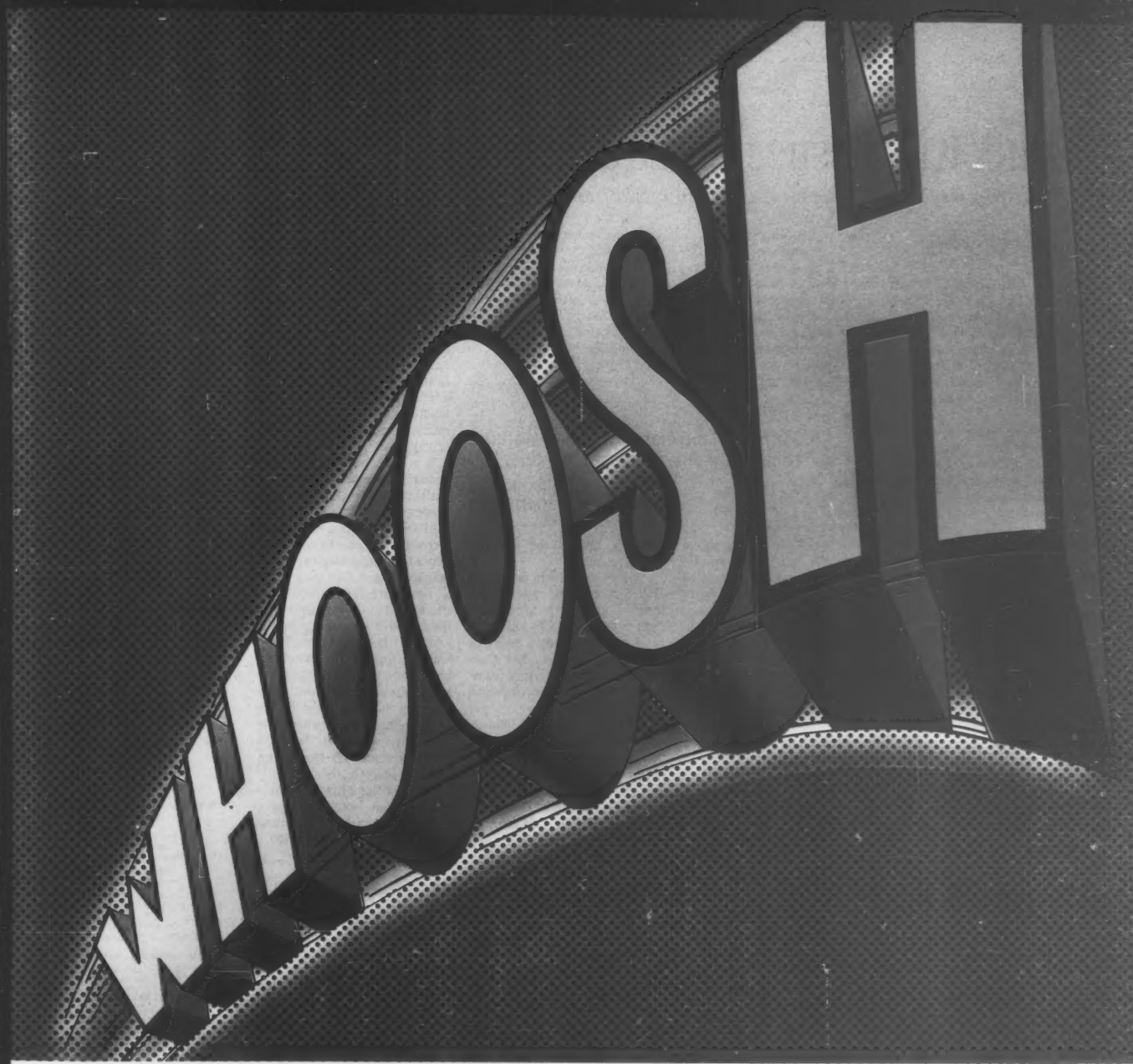
U.S. customers will be able to access the services via Information Network's 276 domestic connection points. Overseas users will gain access via attachment to local connection points planned for appropriately equipped host computers and terminal devices.

It's a small world

In addition to the U.S., these services will be made available in Austria, Belgium, Canada, Denmark, France, Italy, the Netherlands, Norway, Spain, Switzerland, the UK and West Germany.

The services include Virtual Storage Personal Computing (VSPC), Application Systems, TSO, MVS, batch via TSO, RJE and VSPC submits, as well as Professional Office System (Profs)-to-Profs messaging, International Business Service Data Transfer and screen mail, a spokesman said.

Pricing per processing unit includes $1.04 each for VSPC and TSO and 97 cents for MVS batch. On-line storage costs per megabyte per day utilized are $3.76 for VSPC, and per M byte per day allocated, $1.96 each for TSO and MVS batch. Initial registration is $71 per mailbox, while the monthly mailbox charge is $24.71 per box.



THIS GIVES YOU A ROUGH IDEA OF HOW FAST OUR SOFTWARE IS.

It's only a rough idea, granted.

But then, how do we convey the speed of our products? Software that can dramatically reduce the use of your computer resources: CPU Time, SIOs and the like. Typically, by as much as 50%. Frequently, even more.

And that not only goes for our sorts, but for all our products.

But there's really only one way to get more than a rough idea of how fast our software is: try it yourself. To arrange for a test on your system, call **201-930-8200.**

We'll whoosh right over.

syncsort INC.

© 1988 Syncsort Incorporated, 50 Tice Boulevard, Woodcliff Lake, NJ 07675.

Frank King issues Lotus decrees

Says vaporware era over, development and delivery take front seat

BY DOUGLAS BARNEY
CW STAFF

CAMBRIDGE, Mass. — Newly appointed Vice-President Frank King intends to crack the whip at Lotus Development Corp., bringing discipline to an unwieldly group of some 700 software developers that has so far failed to ship a raft of critical new products.

"I am here to develop application systems and bring more development discipline," King said last week in his first interview since joining Lotus.

But one thing King will decline to work at is preannouncing products, a Lotus practice that has drawn much criticism and given the firm 11 products on the vaporware list. "I want us to talk about development activities when they are done," King explained.

Unlike a new U.S. president, King has not enjoyed a honeymoon period since he joined the firm as senior vice-president of Lotus's Software Products Group in March, just a week after the company announced a near six-month delay of 1-2-3 Release 3. This next version of 1-2-3, arguably Lotus's most important product ever, works but is simply too big for today's Microsoft Corp. MS-DOS.

The problem with 1-2-3 Release 3 illustrates why Lotus hired King to head up its software development efforts. A lack of discipline and communication among the various Release 3 development teams created a product too big for MS-DOS's britches, analysts said.

> "I AM HERE TO develop application systems and bring more development discipline."
>
> FRANK KING
> LOTUS DEVELOPMENT CORP.

But Release 3 is only one of King's worries. He has also inherited the task of getting 10 other announced products to market: Modern Jazz, Agenda, Notes, Symphony Release 3.0, 1-2-3 for Unix, 1-2-3/M, 1-2-3/G, 1-2-3/Mac, Blueprint and Lotus/DBMS. The bulk of these products were announced long before hitting the beta-test circuit, building user expectations and frustration because of the long development time frames.

In light of its large number of developers, Lotus has been surprisingly short on deliveries, analysts said. "Look at the number of people they have in research and development and you say, 'Where are the products?' The company is long on promises and short on delivery," said Rick Sherlund, a software analyst at Goldman, Sachs & Co.

That could change as King, the former vice-president of IBM's Entry Systems Division and key developer of DB2 and SQL/DS, tackles the development problems.

Despite heat from users and Wall Street, King says he believes Lotus needs little more than a tune-up. "We need to tune, and we need to be more formal in some areas, but in no sense do we need to fundamentally change the development process," he said.

King has already held a tighter rein on the development process with daily code error reports and has taken a hard look at current projects.

On his IBM Personal System/2, King uses an internal electronic mail system that runs under OS/2 to get data on code errors and development status — a system that was up and running during the exclusive *Computerworld* interview.

"I can't exist unless I know the details. Every day I get reports on the number of errors that were found the previous day in various pieces of code," King said.

Besides daily error reports, King is expected to step up overall code reviews and has modified the development structure at Lotus. Now, certain individuals are responsible for particular functions, such as external communications, across the entire product line.

It is not enough, however, for Lotus products to hit dealers' shelves. The firm has the added burden of making those products work together and share data effectively — a goal the company hopes to achieve with its shifts in management.

Based largely on a reputation established at IBM, analysts said they believe King is up for the job. "He brings the ability to manage lots of programmers, knows how to set up timetables, keep tabs on things and make sure development projects are on schedule. That is what he is there for," said Scott Smith, a software analyst at Donaldson, Lufkin & Jenrette, Inc.

The last thing King intends is to disappoint Lotus customers by not delivering on its promises. "We will get it done," he stated.

Wang teams with Banyan, targets PC LAN market

BY JAMES DALY
CW STAFF

NEW YORK — Wang Laboratories, Inc. has decided that if you can't beat 'em, you may as well join 'em and last week launched a broad foray into the PC LAN market that has been nibbling away at the low end of its departmental computer sales.

Leading the charge of a multipronged line of local-area network products and services is the Wang PC LAN, a set of software and hardware products that link the Wang PC 200 and 300 series and IBM Personal Computer compatibles into work group and departmental computing systems.

At the heart of the line is a series of network servers — the LS-10, LS-20 and LS-100 — supporting the Banyan Systems, Inc. Virtual Networking Software (Vines). Wang said it will also sell, service and support Vines/286 and Vines/386 as well as Banyan's high-end CNS LAN server.

"Every minicomputer vendor has been severely hurt by the influx of PC LANs, and this arrangement immediately gives Wang something they've needed: an inroad into the LAN marketplace with a company that is well established in that field," said Doug Gold, an analyst at Framingham, Mass.-based International Data Corp.

Last year, Hewlett-Packard Co. teamed with Microsoft Corp. for the LAN Manager with Unix, and analysts predict similar arrangements will emerge down the road.

The LS-10 and LS-50 servers will be priced at $8,625 and $11,035, respectively.

Vines/286 for the LS-10 is priced at $1,895, and Vines/386 for the LS-50 will cost $4,995. The price for the LS-100 server, which includes Vines and the CNS server, will range from $21,995 to $27,395. All will be available this month.

The Lowell, Mass.-based firm said that their Wang PC LAN does not supercede Wangnet, its current network offering. "It's a completely different product," said Gerry Paul, Wang's vice-president of systems for research and development. "Wangnet is a cabling system that provides multiple services, like running traditional Wang workstation protocols, as well as Ethernet. The Wang PC LAN can run on top of Wangnet."

Wang also announced PC LAN/VS Access, a set of communications software products that give PC LAN users access to applications and services on Wang's VS minicomputers.

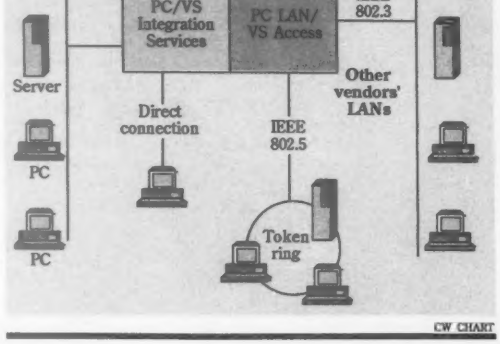
PC LAN/VS Access provides a VS connection to both Ethernet and token-ring transports running Vines, 3Com Corp.'s 3+, Novell, Inc.'s Netware and the IBM PC LAN network operating systems. PC LAN/VS Access will be priced from $2,000 to $5,500 and will reportedly be available in the third quarter.

Additionally, Wang announced PC/VS Integration Services, a set of four core software products that give users access to VS applications over Ethernet and token-ring.

All are scheduled to be available between July and the third quarter of this year.

Tying it together

Wang's latest products provide VS access and services to personal computers on its own and alternate LANs



CW CHART

COMPUTERWORLD

Editor in Chief
Bill Laberis
Executive Editor
Paul Gillin

News Editor
Peter Bartolik

Senior Editors
James Connolly, Management
Clinton Wilder, Industry
Elisabeth Horwitt, Networking
Charles Babcock, Software
Patricia Keefe, Networking
Ed Scannell, Microcomputing
Douglas Barney, Microcomputing
Stanley Gibson, Systems

Senior Writers
Rosemary Hamilton
Nell Margolis
Alan J. Ryan

Staff Writer
James Daly

New Products Writer
Sally Cusack

Features Editor
George Harrar

Senior Editors
Glenn Rifkin
Janet Fiderio, Executive Report
Joanne Kelleher, Spotlight
Amy Sommerfeld Fiore, In Depth

Special Projects Editor
Michael L. Sullivan-Trainor

Senior Writer
David A. Ludlum

Associate Editors
Deborah Fickling
Kelly Shea

Researcher
Bonnie MacKeil

Managing Editor
Donovan White

Chief Copy Editor
Patricia Heal Erickson

Assistant Chief Copy Editor
Steven M. Ulfelder

Copy Editors
Mary Grover
Martha E. Ruch
Sharon Baker
Marie T. Burke
Cathleen A. Duffy
Richard R. Pastore

Design Editor
Marjorie Magowan

Graphics Specialists
Frank C. O'Connell
Amy J. Swanson

Graphics Researcher
Laura O'Connell

Graphic Designer
P. Charles Ladouceur

Assistant to the Editor in Chief
Theresa Gallant
Editorial Assistants
Patricia Faherty
Linda Gorgone
Lorraine Witzell

Rights and Permissions Manager
Nancy Shannon

News Bureaus
Mid-Atlantic
201/967-1350
Alan Alper, Correspondent

Washington, D.C.
202/347-6718
Mitch Betts, Correspondent

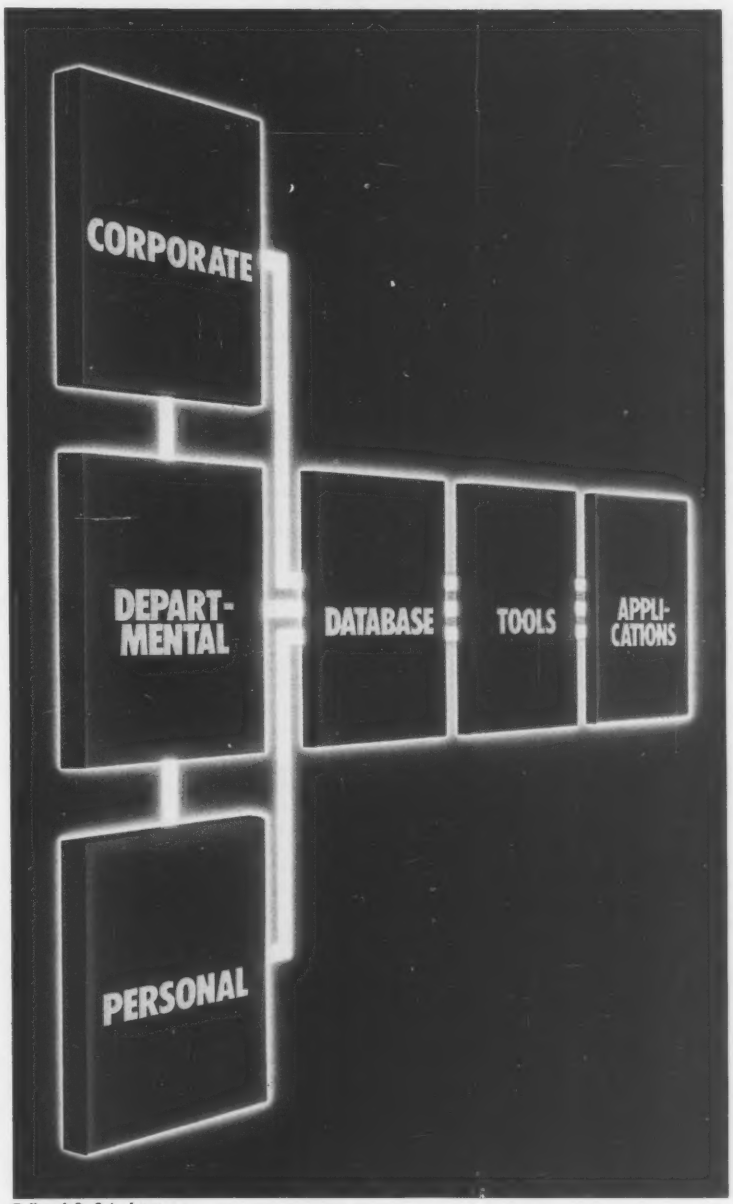
West Coast
415/347-0555
Kathy Chin Leong, Bureau Chief
Julie Pitta, Senior Correspondent
James A. Martin, Correspondent
Stephen Jones, Correspondent
J.A. Savage, Correspondent
Mary Elliston, Editorial Assistant

Midwest
312/827-4433
Jean S. Bosman, Correspondent

IDG News Service
Kathleen A. Gow, Director

Main Editorial Office
Box 9171, 375 Cochituate Road
Framingham, MA 01701-9171
617/879-0700

ACCESS THE TECHNOLOGY ONLY CULLINET CAN PROVIDE. ACCESS 3X3.



Cullinet's 3×3 Architecture.

Cullinet's 3×3 is much more than an architecture. It's a means of integrating all of your company's information resources. Our approach provides for the integration of three sets of software products – databases, development tools and applications – and their connectivity across three distinct computing environments – corporate mainframes, departmental systems and personal computers. It's working and working hard for more and more corporations worldwide.

Throughout the past year, Cullinet has told the stories of companies that have found total solutions to their business problems within this three-tiered offering of information management software and productivity tools. Cullinet's broad product line includes IBM® compatible software as well as software for Digital VAX™ systems and other departmental platforms. And our database products, productivity tools and fourth-generation business applications feature embeddable artificial intelligence and have been designed to allow the utilization of voice-response technology.

Integration is the bottom line. And Cullinet has consistently improved the bottom line for companies that have purchased our applications for manufacturing, project management, distribution management, finance, banking and human resources. By reducing implementation costs, increasing productivity and ensuring that the right information gets to the right people at the right time, Cullinet has enabled its customers to run their businesses as single integrated enterprises.

Find out more about the *one* software company that can link solutions and deliver critical applications to every level of your organization. Call toll-free 1-800-551-4555. Or write to Cullinet Software, Inc., 400 Blue Hill Drive, Westwood, MA 02090-2198.

Cullinet®

An Information Technology Integrator
For The 80s, 90s And Beyond.

IBM is a registered trademark of International Business Machines. VAX is a trademark of Digital Equipment Corporation. The Cullinet logo is a registered trademark of Cullinet Software, Inc. © Copyright Cullinet Software, Inc. 1987.

GM fits in low-cost MAP before MAP/TOP expo

BY JEAN S. BOZMAN
CW STAFF

DETROIT — As the manufacturing industry gears up for the early-summer debut of the full-dress version of Manufacturing Automation Protocol (MAP), the standard's champion is hard at work equipping its factories with a low-cost alternative.

The full-function MAP 3.0 may be, as IBM recently called it, "the solution for plant automation communications," but General Motors Corp.'s current strategy is to implement an earlier, less elaborate — and less expensive — version.

It may seem ironic that this is happening as anticipation builds for The Enterprise Networking Event '88 International, a June exposition sponsored by the U.S. MAP/TOP (Technical Office Protocol) Users Group and the Corporation for Open Systems.

As the leader in the eight-year struggle to forge a standard for integrated communications products for the factory floor, GM might be expected to revel in this culmination of its efforts to bend automation suppliers to the will of their customers.

"We know that MAP 3.0 is around the corner," explained William Riker, senior project engineer at GM's Tech Center, "but we want to introduce carrier-band MAP to all plants, whether or not MAP 3.0 is installed there."

Take the bridge

Carrier-band MAP, technology based on MAP 2.2, is designed to bridge the gap between full MAP 3.0 implementation and no MAP at all. It will be installed at all 28 GM plants in the U.S. and Canada; many of those plants will ultimately feature some implementation of MAP 3.0.

The cost benefits will propel carrier-band to nearly every corner of GM's auto empire — even when MAP 3.0 comes along. "We feel that 95% of GM's plant equipment will use carrier-band technology," Riker predicted. "All our plants will be using carrier-band segments in some way."

Plants can easily add the carrier-band loops to a MAP 3.0 backbone network by swapping two interface boards on the carrier-band loops, Riker said. But, for now, planning and design for all MAP installations at GM begin at the Tech Center, where GM plant managers test all factory-specific MAP equipment and software.

So far, eight of GM's 28 plants have carrier-band installed. By year's end, 12 plants will be using it, Riker said.

Carrier-band is catching on because, unlike MAP 3.0, it requires no multiplexing of signals or amplification repeaters. It is a single-channel, data-only use of standard RJ11 broadband cable. But factories that use it need to consider its limitations: Carrier-band segments must be shorter than 700 meters and can support no more than 50 nodes.

Because of its significantly lower installation and maintenance costs, carrier-band allows MAP to extend to areas of a factory that require only simple instructions — such as scheduling changes for an assembly area — but do not need to receive frequent network messages. "Carrier-band is easy to install and to maintain, and it uses passive media components, so it's less complex," Riker said. The primary difference between MAP 2.1 and MAP 2.2 specifications, he said, is support for carrier-band segments. Carrier-band users will be able to migrate to full MAP 3.0 as it comes on-line at their plants, he added.

Eventually MAP 3.0

GM's Saturn plant in Tennessee will support full MAP 3.0 when factory operations begin in 1990. But even there a MAP 3.0 backbone network will be linked to multiple carrier-band segments through IEEE 802.4 carrier-band interface bridges. The bridges are programmed to recognize the tokens used on different carrier-band segments. In this way, segment-specific messages broadcast over the backbone MAP 3.0 network will reach remote carrier-band loops.

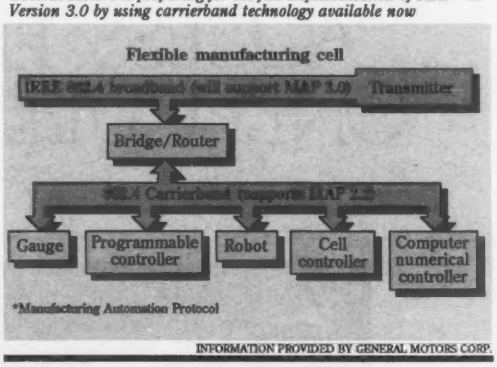
GM's engineering group has designed software specifically to support MAP 3.0's Manufacturing Message Service on carrier-band segments, Riker said. In doing this, GM is rejecting as inadequate a MAP 2.1 application layer called the Manufacturing Message Format Standard now used at the company's Pontiac, Mich., truck and bus plant. GM has no plans, however, to retrofit the Pontiac plant, which opened MAP 2.1 operations last year.

"Pontiac has all the functionality of MAP 2.1," Riker explains. "The expense in going to MAP 3.0 is not the expense of swapping the interface boards; it's the expense of rewriting all the applications."

But observers should not mistake GM's embrace of carrier-band for a rejection of MAP 3.0, Riker cautioned. "Carrier-band is not meant to replace broadband," he said. "It allows you to off-load the data traffic onto these carrier-band segments, and it gives you flexibility in designing a factory."

Setting the mold

General Motors is preparing for the full implementation of MAP in Version 3.0 by using carrierband technology available now*



INFORMATION PROVIDED BY GENERAL MOTORS CORP.

Stratus and Sybase team up

Point double-barreled guns at Tandem, DEC

BY NELL MARGOLIS
CW STAFF

BOSTON — Stratus Computer, Inc. has harnessed the relational data base capabilities of Sybase, Inc. to create a double-barreled force in the on-line transaction processor (OLTP) market that could generate headaches for Tandem today and DEC tomorrow, according to market analysts.

Announced last week, Stratus's SQL/2000 is a Sybase-based relational data base management system designed specifically to run on Stratus's XA2000 Continuous Processing Systems family of fault-tolerant multiprocessing computers.

The combination is the fruition of a two-year joint development project between the Marlboro, Mass.-based hardware manufacturer and the Berkeley, Calif., software maker. It is positioned to unite technologies that were geared for OLTP from the ground up rather than re-engineered to compete in the $17 billion OLTP arena, according to David Wu, an analyst at S. G. Warburg & Co.

"If you design your car from the bottom up to be a Porsche, it's a Porsche," Wu said. "A BMW, no matter how versatile it may be, is still a BMW; it isn't a Porsche."

The fault-tolerant XA2000 platform provides a multiprocessing architecture combined with VOS, a Stratus operating system designed to handle the rigors of transaction processing, said William E. Foster, president and founder of Stratus.

Offers architecture

Sybase brings to the party its requester-server architecture, increasingly seen as the model to beat — or join — in the OLTP-oriented data base market, according to market analysts. Under the Sybase system, user applications are segregated from data management functions, yielding gains in speed, efficiency, ease of application development and data integrity, according to Sybase Executive Vice-President Robert S. Epstein.

A significant portion of SQL/2000 is packaged directly into the VOS operating system, Foster said. So tight is the integration between the new data base product and the Stratus operating system, he claimed, that a single interface is used to query both VOS and SQL/2000 files.

Such integration, Wu said, is one of the SQL/2000 features that further suits up Stratus for commercial battle with archrival Tandem Computers, Inc., against whose Nonstop SQL product Stratus is directly positioning its new offering.

Tandem is not the only company likely to feel the competitive pressure of SQL/2000. Down the road, Foster said, "I think DEC is going to become our biggest competitor." Digital Equipment Corp. has announced its intent to enter the OLTP market in the near future.

In addition to SQL/2000, Stratus announced its commitment to integrating its OLTP offerings with a variety of workstations and personal computers through a number of interfaces scheduled to be announced during the next 18 months.

Available this month, the SQL Server component of SQL/2000 will be priced starting at $14,000. The SQL/2000 Dat workbench tool kit will start at $12,500, and the SQL/2000 VOS Server will be included in VOS Release 7.0 at no extra charge. Expected in the fourth quarter, the SQL/2000 C, PL/1 and Cobol precompilers are set to be priced from $3,000.

DEC pact for Intact?

BY STANLEY GIBSON
CW STAFF

When Digital Equipment Corp. makes a major transaction processing announcement in the near future, it will likely include a transaction processing monitor called Decintact.

The product is reportedly an adaptation of a package called Intact, designed by Advanced Systems Concepts, Inc. in Hoboken, N.J.

One major bank with a large installation of DEC VAXs that has been using Intact for five years acknowledged that it has been beta-testing the version of Intact that DEC plans to sell.

An MIS official at that bank said the DEC version will be tied more closely to the operating system that the bank has been using in order to offer increased efficiency.

The bank has not beta-tested Version 5 of DEC's VMS operating system. That version brought symmetrical multiprocessing, considered a key to efficient transaction processing, to the VAX architecture for the first time.

DEC has said for several months that a transaction processing announcement is waiting in the wings. But a DEC spokesman said that a transaction processing announcement will not be made until after May 9, when an announcement is expected.

Home shopping

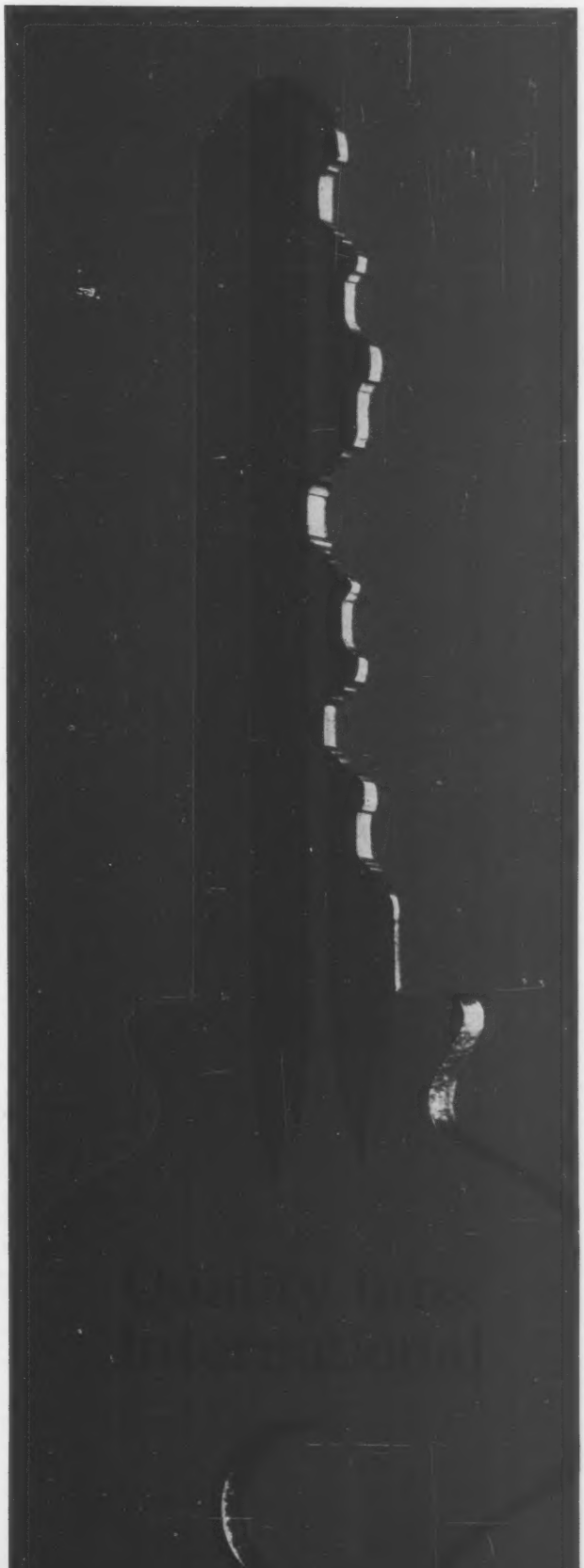
Decintact was recently described on DEC's Electronic Store, an on-line electronic shopping and information facility.

However, only announced products are normally put in that videotex service, and the description of Decintact was withdrawn after DEC became aware that the product had been posted, a DEC spokesman said.

According to that description, Decintact "provides a foundation for building simple and complex transaction processing applications on one or more VAX systems under the VAX/VMS operating system" and "can support either single-threaded or multithreaded design methodologies. Multiple versions of Decintact can execute at the same time, share physical memory and be completely independent."

The program provides terminal, queue, network and file management and restart/recovery, security and menu dispatching, according to the description.

VMCENTER II
Smart Economics.



The Quality experience: overnight savings of over 90%.

Staying profitable while staying competitive. It's the classic challenge. But with the right tools, you can do it.

That's the lesson at Quality Inns International, where astute information systems management has saved money while helping a worldwide organization deliver superior value to its customers.

SAVINGS IN TIME AND RESOURCES.
From menial chores to management reports, VMCENTER II's comprehensive capabilities have made a decisive difference in the caliber and cost-effectiveness of QI's MIS operations.

Take overnight backups. They used to be a nightmare. Now they're a dream. With better than 90% cost savings in both time and tape—plus better reliability than ever.

Or take disk space management: with easy user archiving, there's suddenly room to grow. Add automated scheduling, foolproof tape handling, improved security, and unprecedented control over batch operations, and no wonder QI's systems management is so strongly "VMCENTERed."

VMCENTER II. THE VM SYSTEMS MANAGEMENT TOOL FOR THE FUTURE.
This performance is impressive. But it's only the beginning. With its broad capability and proven performance, VMCENTER II is the most important tool you can buy for *all* your VM systems—from 9370 to 3090 to whatever the future may bring.

VMCENTER II. Your comprehensive solution for today. Your key to long-term success.

For more information, write or call today.

800-562-7100
703-264-8000

VM Software, Inc.
1800 Alexander Bell Drive
Reston, Virginia 22091

The Quality Choice
Comfort Quality Clarion
Inns · Hotels · Suites · Resorts

VM SOFTWARE INC.

© 1987 VM Software, Inc.

1-CWX-880502

DB2 upgrade tied to top CPUs

BY CHARLES BABCOCK
CW STAFF

IBM opened new horizons of data management with its announcement of the ESA operating system and DB2 Version 2. At the same time, IBM has cranked up the pressure on its mainframe customers to upgrade to a 3090E processor.

Despite the greater number of millions of instructions per second in the E series and 16 terabytes of virtual memory in ESA, some observers questioned whether the upgrades are necessary for all customers.

Many of IBM's largest customers said they do need the upgrades, however. Even though users have yet to write an application that taxes the 2G bytes of virtual memory offered by ESA's predecessor, MVS/XA, they said they like the 16 terabytes of virtual memory for data offered by ESA.

"It's obvious with DB2 you will be able to get much higher transaction rates. . . . We're willing to pay for performance," said Howard Fosdick, project leader for relational data base at Amoco Corp. in Chicago.

Another Midwestern DB2 user who had planned to move to ESA said it is geared toward large shops with massive amounts of data. "I bet there are a lot of unhappy smaller shops that don't want to pay the price," he said.

A price differential of $1,300 per month separates ESA base components from MVS/XA. In a similar vein, a $1,300 price differential separates DB2 Version 1.3 from Version 2.0. But the heaviest hit occurs in hardware: A 3090 Model 200 customer will not have the option of upgrading to a 3090 Model 200E; instead, he will have to go to a Model 300E at an upgrade cost of $1.6 million or a Model 400E at an upgrade cost of $3.7 million (see chart).

In addition to satisfying the large customer demand for more performance, IBM appears to have grown impatient with the continuing large base of users who have not yet made their move to a 3090E. According to Computer Intelligence, a market research firm in La Jolla, Calif., a total of 2,392 IBM 3090s have been installed in the U.S. As of Jan. 1, half of them were Model E processors.

Perhaps more significant is that an additional 3,582 older 3080 mainframes are still in service and are not candidates to run the ESA operating system.

A DB2 user who wishes to take advantage of DB2 under ESA's 186 transaction/sec. capability must move to IBM's ESA operating system and its top-of-the-line processor.

IBM sent a message to its non-3090E users April 19 when it stated that future enhancements to both IMS and DB2 will be made primarily for the ESA environment, observed Tony Deakins, vice-president of Auxco Consulting in Orlando, Fla.

IBM's statement of direction indicated that those who do not migrate to ESA will eventually be stuck with an outmoded data base management system. In addition, IBM did not name MVS/SP Version 1 as an operating environment of DB2. Instead, it listed only Version 2, which is MVS/XA, and Version 3, MVS/ESA.

'Final cut'

"IBM has finally made the final cut. The minimum now is MVS/XA," noted Stephen Gerrard, vice-president of marketing at Applied Data Research, Inc. in Princeton, N.J.

"This is the beginning of a series of typical IBM moves where DB2 users will get the feeling they are being left behind if they don't move up to ESA," Gerrard said.

But there are likely to be many users who will drag their feet rather than take the plunge, industry observers predicted. "Right now, only 10% of DB2 users will immediately go to ESA," said Paul Hessinger, chief technical officer at Computer Task Group, Inc., a Buffalo, N.Y., consulting firm.

No easy way up

IBM's MVS/ESA requires an E series 3090, and users of older 3090s must move upscale when converting to the newer line

3090 model	List price increase	Required upgrade	Conversion cost
400	$8.5	600E	$3.1
200	$4.5	300E or 400E	$1.8 or $3.7
180	$2.6	200E	$1.4
150	$1.7	180E	$950,000

CW CHART

Novell focus on OS/2, SQL

BY PATRICIA KEEFE
CW STAFF

AUSTIN, Texas — Novell, Inc. is gearing up to add SQL data base capability to its bag of OS/2 connectivity products, according to sources close to the networking vendor.

The capability will be supplied by local subsidiary Softcraft, Inc., which is poised to announce a version of its Btrieve data base utility said to feature full ANSI-standard SQL. Novell is readying a multiple coprocessor, probably an Intel Corp. 80386-based very high-performance server, according to a Novell value-added reseller. The sources confirmed plans to introduce the server, along with the SQL data base — to be packaged with Novell's network operating system, SFT Netware Version 2.1 — at the June PC Expo in New York.

Novell is expected to ship this month Version 2.1.1, which contains the first release of OS/2-compatible Btrieve.

The offering is expected to counter SQL server capabilities offered by Microsoft Corp. under an alliance with Sybase, Inc. and the server version of the Data Base Manager feature of IBM's OS/2 Extended Edition.

Cullinet layoff

FROM PAGE 1

Strategies, Inc. acquisition, which landed Cullinet a repetitive manufacturing system that runs under the Pick Systems Pick operating system on DEC hardware, and Planning Control International, Inc., which provided Cullinet with a moderately successful performance management system.

A source close to Cullinet said employees were nervous and confused at week's end as they waited for today's news. The source claimed the company was planning to meet with employees this morning to notify those who have lost their jobs. In the afternoon, those employees who will remain will meet with supervisors to discuss the company's new direction.

Since the return of company founder John Cullinane in late March, Cullinet has been sending out signals that it would soon be trimming fat in order to return to profitability.

Shortly after Cullinane's return, top executives were reassembled into a cast that no longer included Chairman David Chapman and had starring roles for President George Tamke and John Landry, who was promoted to executive vice-president of development, which was a newly created position.

The new executive team indicated that a leaner Cullinet would now carry out the strategy of the so-called "3X3 architecture" that had been implemented by Chapman. The 3X3 strategy refers to data base, application and development tools offered across mainframes, minicomputers and microcomputers.

'More effectiveness'

In March, when Cullinane was asked if a layoff was imminent, he said, "I'd say there'd be a restructuring of certain operations that will result in more effectiveness."

Within a few weeks, President and Chief Operating Officer Tamke, in discussing which areas of the company could possibly be trimmed, said "nothing is sacred."

Landry, meanwhile, said at that time that a major announcement would soon be made that would not "alter the goals of 3X3 but what it would change is the way in which we go about attaining them."

Cullinet's far-reaching strategy for expansion into new markets is just becoming reality.

But the company has given no assurances that its earlier intentions to be profitable by the end of this fiscal year, which concluded last week, will be met.

As a result, the company has been under intense pressure lately to wash off the red ink and return to profitability.

Analysts, therefore, applauded the expected cost-cutting measures.

"I think they're going to end up a stronger company," said Robert Therrien, an analyst at Paine Webber, Inc.

One IDMS/SQL user, Gus Chicola, a data base administrator at the County of Metro Dade Office of Computer Services in Miami, said he had not been informed by Cullinet that cost-cutting measures were under way. "It makes you wonder what's going on with the company," Chicola said, "but if the company is undergoing some reevaluation, that might not be so bad."

"What has to be done now at Cullinet has to be very drastic," said Rob Anderson, a vice-president and senior technology analyst at Sutro & Co. in San Francisco. "They don't have much in the bank for a rainy day, and it's raining now."

Jerry Peters, senior vice-president of information services at the Exchange National Bank in Chicago, which is a beta-test site for the Cullinet Banking System, said he applauds any move to cut fat at Cullinet. "Layoffs, per se, are no source of concern to us," he said. "If they're cutting into the meat, then I'm going to be concerned."

Microsoft, Mac still item

BY STEPHEN JONES
CW STAFF

REDMOND, Wash. — Microsoft Corp. made it clear last week that its legal battle with Apple Computer, Inc. will not prompt it to halt Macintosh software development. Despite earlier hints by Microsoft Chairman Bill Gates that the company might cut off Macintosh development in the event of an Apple lawsuit, Microsoft announced a version of its Powerpoint desktop presentation package.

Powerpoint 2.0, the first Macintosh software from Microsoft since Apple charged last March that the developer stole the Macintosh's "look and feel," will reportedly ship later this month.

Enhanced color options

The program was designed to take advantage of the Macintosh II's color capabilities and will sell for $395 — the same price as Powerpoint 1.0.

While Microsoft was promoting Macintosh software last week, Apple showed no signs of letting up on its charges against the developer.

In a filing with the U.S. District Court in San Jose, Calif., Apple refuted Microsoft's countersuit. The countersuit claimed a right to the Macintosh interface look and feel and alleged that Apple is seeking to hurt Microsoft's business.

Industry watchers said Microsoft had little choice but to continue its development for the Macintosh, with analysts estimating that Mac sales will net Microsoft $100 million in revenue for this year.

"Microsoft can't stop development for the Mac — it's too important a platform for them to ignore," said Rick Sherlund, an analyst at Goldman, Sachs & Co. in New York.

But Microsoft claims it will upgrade all of its Macintosh products, including Word, and continue with new product development.

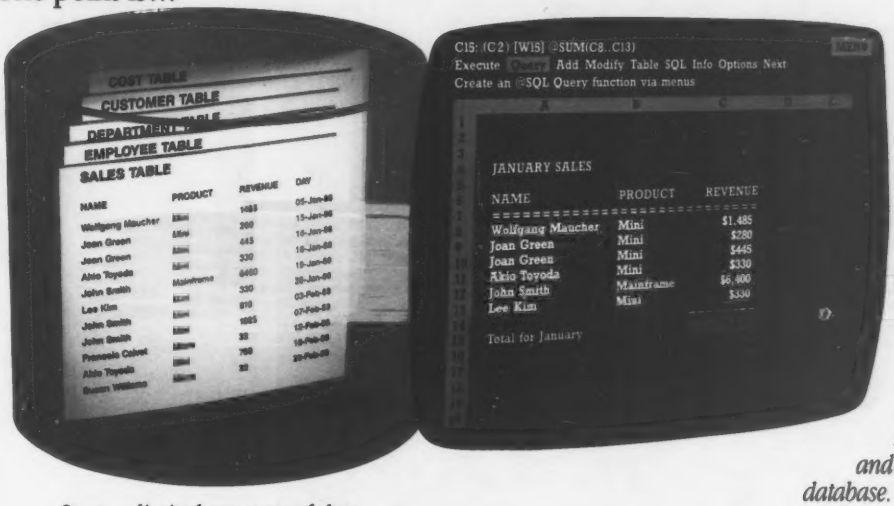
"We've made it clear that we're going straight ahead with the Macintosh. Everything is leading toward an upgrade," said Lewis Levin, group product manager for Microsoft's graphics business unit.

Powerpoint 2.0 requires a Macintosh Plus, Macintosh SE or Macintosh II with 1M byte of random-access memory and two 800K-byte floppy disk drives or a hard disk.

Powerpoint 1.0 users can upgrade for $40.

ORACLE® turns Lotus 1-2-3 into a full function database.

ORACLE, the world's most powerful relational database, now works from inside your Lotus 1-2-3 spreadsheet program. Familiar 1-2-3 menus guide you through creating, modifying and retrieving data in your database. You can even perform ORACLE database functions automatically using standard Lotus macros and formulas. The point is...



Store unlimited amounts of data in your ORACLE database.

> *"What a boon to the power spreadsheet user... most wish that [Lotus 1-2-3] could do more, store more, be updated more easily... with ORACLE running behind it, it can do all this and more."*
>
> Andrew M. Seybold, Publisher, *Outlook on Professional Computing*

Use all the features of Lotus 1-2-3 to analyze, report, and graph data in your ORACLE database.

...If you already know how to use Lotus 1-2-3, then you already know how to use ORACLE.

By putting data into a database, Lotus 1-2-3 spreadsheet's performance is improved, long re-calcs are eliminated and your worksheets are smaller and more manageable.

- Have ORACLE for 1-2-3 build the query automatically for you and retrieve just the data you need.
- A single command automatically creates new database tables from data in any existing worksheet.
- In update mode, changes in your worksheet become changes in your database. And if you make a mistake, you can...
- Undo changes. Or save your changes permanently in your database and worksheet.
- Share the same data in multiple worksheets, or even across a network of different computers with many users.

ORACLE®
COMPATIBILITY · PORTABILITY · CONNECTABILITY

Call 1-800-ORACLE1, ext. 105 today.
For international pricing call (415) 598-8290

Act now, and we'll pay sales tax and shipping. So fill out and mail the attached coupon, or call today. You can also purchase ORACLE for 1-2-3 at your favorite computer store. **$199.***

Dear Oracle,

ORACLE for 1-2-3 • Oracle Corporation
20 Davis Drive • Belmont, CA 94002

Yes, I have an ☑ 80286/80386 PC running ☑ DOS 3.0+ and ☑ Lotus release 2.01. I also have ☑ 640KB of RAM, plus either ☑ 1MB of extended memory or I will reassign 1MB of my expanded (above-board) memory as extended memory. Please send me the database I already know how to use — the ORACLE database add-in for Lotus 1-2-3, on ☐ 5¼" or ☐ 3½" disks. Enclosed is my: ☐ check, or ☐ VISA ☐ MC ☐ AMEX credit card authorization for $199.*

PRINT NAME _____ DATE _____

COMPANY _____ TITLE _____

STREET *(No P.O. boxes, please)* _____

CITY _____ STATE and ZIP _____

PHONE _____

CREDIT CARD NUMBER _____

CARD EXPIRATION DATE _____

SIGNATURE _____ COMPUTERWORLD

*Prices valid in U.S. only. © 1988. ORACLE is a registered trademark of Oracle Corporation. Lotus and 1-2-3 are trademarks of Lotus Development Corporation. TRBA

Insurance firms seek paperless office

Look to scanning devices, expert systems to help increase efficiency

BY KATHY CHIN LEONG
CW STAFF

PALM SPRINGS, Calif. — More than 800 major users flocked to the IBM Insurance Executive Conference here last week, anxious to make progress toward the goal of a paperless office.

At the 12th annual meeting of domestic and international MIS directors, electronic imaging and expert systems took center stage. Compared with past years, these two technologies now seem to offer relief for the truckloads of documents plaguing the $4 billion insurance industry.

Skyrocketing medical costs, legislative reforms and increased pressure to offer new products all add to the job complexities in insurance, noted David Griffin, vice-president of underwriting at Fireman's Fund Insurance Co.

Kathy Wilson, IBM's director of insurance industry marketing, added, "There is already tremendous diversity in insurance. You have life, property, casualty and health, and if you start breaking this down, you are hard-pressed to find a similar set of solutions."

Common to insurance companies, however, is the need to decrease paperwork. Unlike other industries that focus on manufacturing goods, the product for these firms is the paper document: the insurance policy.

For that reason, users are hungry for information that would eventually lead to a paperless office. They see an immediate use for image scanning devices, which scan insurance policies and case photographs and diagrams.

"That's why I came here," said one user from Physician Mutual. "It gets really expensive to store files."

Adding to the excitement was a briefing on IBM's joint-development image scanning project with United Services Automobile Association, which will blaze a trail for others to follow. The San Antonio-based organization has installed IBM workstations in a network of optical storage devices, image scanners and IBM 370 mainframes. Users at the company will store mail on optical disks, eventually reducing the need to save original documents.

Another user offered his solution to reduce the paperwork load. Provident Life & Accident Insurance Co. in Chattanooga, Tenn., has developed a personal computer software package that enables staff secretaries to create more accurate documents through the use of boilerplate features.

Before, the staff was generating reams of wasted paperwork. Since the software package was added, the cost of generating a letter has dropped from $2 to 28 cents, said John Germann, vice-president of MIS applications at Provident.

IBM's Wilson

Leader of the pack

For many years, the insurance sector has been a leader in automation because of the need for quick turnaround.

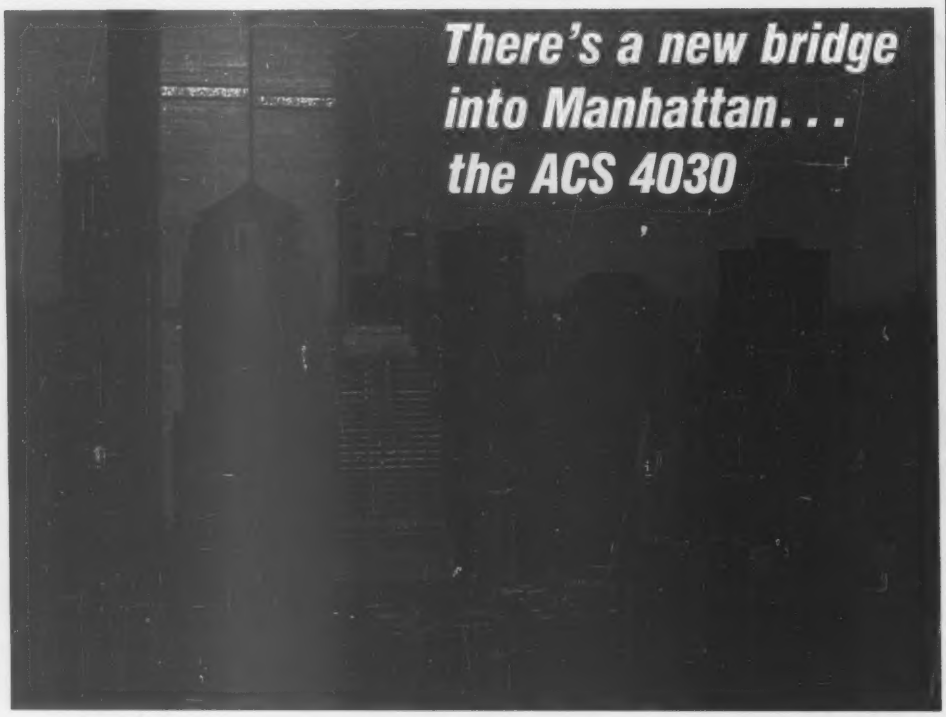
In such an industry, getting a policy to the client quickly may mean the difference between clinching or losing the contract, according to MIS directors. And if customers fail to receive reimbursement checks in a timely fashion, they may not sign up for services the following year.

This is why CNA Insurance Co. in Chicago urged MIS professionals to adopt expert system software as a means of accelerating the work of claims adjusters and examiners.

Danielle Barcilon, senior manager of life and health systems at CNA, said she expects her claims adjusters will be 30% to 40% more productive with the use of an expert system the company co-developed with Policy Management Systems Corp. in Columbia, S.C.

CNA is currently testing the expert system package, which operates on an IBM Token-Ring network. Among other things, the system is expected to alleviate the hassle for claims adjusters of poring through manuals to determine whether an accident or medical treatment is covered.

"We want to increase the productivity of our examiners and, at the same time, make our claims payment consistent," Barcilon said.



"The ACS 4030 dramatically cut our communication costs and maintained reliability – at a quarter the price of other Ethernet bridges." Charles Fischer
Director of Operations, Dalcomp, Inc.

Dalcomp, a supplier of online information for the financial industry, needed a better way to connect offices on both sides of the Hudson. Dalcomp had five point-to-point connections using expensive dedicated lines. Dalcomp needed to cut network costs, but couldn't afford to sacrifice network performance. Dalcomp chose the ACS 4030 to connect Ethernets already in place.

Dalcomp saved on equipment costs and cut network charges by 60%. Dalcomp looked into another remote bridge; it was four times as expensive. Dalcomp saved by choosing the ACS 4030 and saved again by reducing the number of dedicated lines from five to two. The ACS 4030 can save you money too.

Saving money doesn't mean sacrificing reliability. Says Fischer, "In our business, we deal directly with major financial institutions. Our service transmits crucial information and we cannot have a down time." Because the ACS 4030 provides load-leveling, if one critical line goes out, the others automatically pick up the slack.

The ACS 4030 fits into your existing system. No need to buy other expensive equipment. And ACC has been developing and supporting networking systems for over 12 years. If you need to connect Ethernets across a river, a parkway, or an entire state, the ACS 4030 can bridge the distance and cut costs, not performance. Call ACC today.

Advanced Computer Communications
720 Santa Barbara Street
Santa Barbara, CA 93101
(805) 963-9431

ACC®
The Interconnectivity Source

	dBASE	ORACLE
SQL	Promises, no dates	IBM DB2 Compatible
Mainframes	No Way	IBM MVS & VM/CMS
Minis	Nope	DEC, HP, Sun, etc.
PCs	All, PC Jr. too	286 & 386 PCs
MS/DOS	<640K programs	>640K programs
OS/2	Ask Ashton-Tate	Yes, first day
Multiuser	Primitive	Mainframe quality
Networking	PC Nets only	PC, mini & mainframe
Fault Tolerant	You must be kidding	CPU & Disk Recovery

THE LAST DBMS

ONLY $199

CALL 1-800-ORACLE1

Oracle Corporation, the world's fastest growing software company,[1] has just climbed past Ashton-Tate to become the world's largest supplier of database management software and services.[2]

Why?

- Because ORACLE® runs on PCs, plus mainframes and minicomputers from IBM, DEC, DG, HP, Prime, Wang, Apollo, Sun, etc.—virtually every computer you have now or ever will have. Ashton-Tate's dBASE runs only on PCs.
- Because ORACLE is a true distributed DBMS that connects all your computers—PCs, minicomputers and mainframes—into a single, unified computing and information resource. dBASE supports only primitive PC networking.
- Because Oracle has supported the industry standard SQL language since 1979. Ashton-Tate promises to put SQL into dBASE sometime in the indefinite future.
- Because ORACLE takes advantage of modern 286/386 PCs by letting you build larger-than-640K PC applications on MS/DOS today, and run them unchanged on OS/2, once OS/2 is available. dBASE treats today's 286/386 PCs and PS/2s like the now obsolete, original PC.

Don't go down in flames. Bail out from dBASE. Call 1-800-ORACLE1 and order your $199-PC copy of ORACLE[3] today. Or just ask and we'll send you information on ORACLE, the number one selling DBMS on minicomputers and mainframes.

ORACLE®

COMPATIBILITY • PORTABILITY • CONNECTABILITY

Call 1-800-ORACLE1, ext. 105 today.

Dear Oracle,

PC ORDER PROCESSING
Oracle Corporation
20 Davis Drive • Belmont, CA 94002

I want ORACLE to be THE LAST DBMS for my 286/386 PC. Enclosed is my ☐ **Check** or ☐ **VISA** ☐ **MC** ☐ **AMEX** credit card authorization for $199 (California residents add 7% sales tax). I understand this copy is for PC development only. Offer valid only in the US and Canada.

Print Name _____ Date _____

Title _____

Company _____

Street *(P.O. Box numbers not acceptable)* _____

City _____

State _____ Zip _____

Phone _____

Credit Card Number _____

Card Expiration Date _____

Signature _____

COMPUTERWORLD

I am a value-added reseller (VAR): ☐ YES ☐ NO

[1] Revenues doubled in 5 of Oracle's 10 years. [2] Sales rate over $200 million in current fiscal year. [3] For PC development use only. Requires a 286/386 PC plus 1-MByte extended memory. Offer valid only in US & Canada. © 1987 by Oracle Corp. ORACLE® is a reg. trademark of Oracle Corp. dBASE is a reg. trademark of Ashton-Tate. Microsoft & IBM own numerous reg. trademarks. TRBA

THE SAS®

Fourth Generation Software

Now there's one software solution for all your Information Center needs. One solution for all your applications, for all your mainframes, minicomputers, and microcomputers. One solution—the SAS® System.

One Solution to Integrate All Your Computing Tasks.

The SAS System gives you efficient data management, superior statistical tools, an easy report generator, customized presentation graphics, and more. Choose between the simple English-like command language or a front-end menuing system with fill-in-the-blank screens. On-line help facilities make it easy to handle every application, quickly and accurately.

You can track sales leads, manage prospect files, determine market share, and present results with the SAS System. Plus you can file employee and applicant records, analyze benefit programs, and manage the payroll. The SAS System can handle all your accounting applications, and produce spreadsheet reports automatically.

That's not all. With the SAS System, you can take orders, keep inventory, and produce mass mailings. Schedule projects, determine product mix, and make forecasts. Your DP staff can measure hard-

SYSTEM
for Your Information Center.

ware resources or system usage, test data bases, and run production programs.

One Solution that's Friendly.

It's simple with the SAS System. You can write front-ends for all your SAS applications. With just a few keystrokes, you can modify the applications as your information needs change. One language handles all your tasks. And if you need to move between several operating systems, you'll find the language, syntax, and commands the same for the mainframe, minicomputer, and PC SAS System.

One Solution with Full Support.

Training is easy too. We offer instructor-based, video-based, and computer-based training. Technical support is provided for our mainframe, minicomputer, and microcomputer users, and documentation comes with your system.

Call us today. International customers, call the International Marketing Department for information on your local distributor.

Whatever your application, the SAS System is your solution.

SAS Institute Inc.
SAS Circle, Box 8000
Cary, North Carolina
27511-8000, USA.

(919) 467-8000, x280
Telex 802505

The SAS System runs on IBM 370/30xx/43xx and compatible machines under OS, TSO, CMS, DOS/VSE, SSX, and ICCF; on Digital Equipment Corp. VAX™ 8600 and 11/7xx series under VMS™; on Prime Computer, Inc. Prime 50 series under PRIMOS®; on Data General Corp. ECLIPSE® MV series under AOS/VS; on IBM XT/370 and AT/370 under VM/PC; and on IBM PC XT® and PC AT under PC DOS. Not all products are available on all operating systems.

SAS is the registered trademark of SAS Institute Inc., Cary, NC, USA. VAX and VMS are trademarks of Digital Equipment Corp., Maynard, MA. PRIMOS is the registered trademark of Prime Computer, Inc., Natick, MA. ECLIPSE is the registered trademark of Data General Corp., Westboro, MA.
Copyright © 1985 by SAS Institute Inc. Printed in the USA.

Unisys ups R&D budget 20%

1988 spending will focus on creation of network manager

BY JEAN S. BOZMAN
CW STAFF

DETROIT — Unisys Corp. is devoting much of its 1988 research and development budget to the creation of a comprehensive network manager that would monitor the flow of voice and data throughout a customer enterprise, Chief Executive Officer W. Michael Blumenthal said last week.

Addressing the second annual meeting of the combined Burroughs Corp. and Sperry Corp. here, Blumenthal said R&D spending this year would increase by 20% over last year's $597 million budget.

"Much of our R&D spending this year will be focused on building a well-developed network manager," Blumenthal told more than 250 stockholders. He did not compare the Unisys product with other network managers, such as IBM's Netview, but it was described as having a similar function. Unisys's 1987 acquisition of Timeplex, Inc. is expected to boost overall sales of computer and networking products. "We expect that networking alone will be a $1 billion business by 1990," Blumenthal said.

Another area of R&D spending will involve co-developing a reduced instruction set computing-based computing platform for distributed applications with Sun Microsystems, Inc. "This underlies our plan to develop fast, low-cost Unix systems that will rival the power of mainframes," Blumenthal said.

Unisys's Blumenthal

He said Open Systems Architecture represents one key product area in which the $9.7 billion corporation could realize revenue potential in the 1990s. "The closed shop is becoming a rarity," Blumenthal said. "No one vendor and no one family of systems can meet all the information needs of a changing [end-user] organization."

Unisys has been positioning its Unix products as a window on mixed-vendor shops. Last year, the firm sold more than $500 million in Unix systems and expanded its base to 10,000 installed Unix-based machines.

WITH REALIA, BE PREPARED FOR A FEW CHANGES IN YOUR PROGRAMMING STAFF

Give your applications developers Realia COBOL. Then stand back.

Realia COBOL brings the power of the mainframe right to your PC. You'll start saving time, money, and resources, whether you're maintaining an old system or creating a new one.

Realia COBOL offers your programmers the quickest compilation and the biggest file capacity of any PC compiler. A 10,000-line program compiles in 76 seconds. A 10,000-record sort takes 43 seconds. Best of all, Realia-compiled programs execute faster than any other PC compiler's. With RealCICS®, you can even handle online CICS programs.

At Realia, we also offer you something that has become a bit of a contradiction in terms: genuine support for a micro software product.

Realia COBOL—when time is of the essence.

REALIA®

10 South Riverside Plaza, Chicago, IL 60606 • (312) 346-0642 • Telex 332979

3Com provides 3+ network with host access

BY PATRICIA KEEFE
CW STAFF

SANTA CLARA, Calif. — 3Com Corp. last week announced and began shipping 3+SNA, said to provide a gateway between users of IBM Personal Computers, Personal System/2s and compatibles on a 3Com 3+ network and host systems operating in an IBM Systems Network Architecture (SNA) environment.

This capability is critical in larger companies, where users need to manipulate data located across a local-area network as well as gain access to systems and applications residing in a mainframe, said Bruce Backa, a 3Com user and director of micro and technical services at American International Group's New Hampshire-based Domestic Brokerage Division.

The turnkey product, which includes an intelligent microprocessor-based adapter and software licensed from Rabbit Software Corp., is an extension of 3Com's 3+ network operating system.

Backa, who heads a regional 3Forum users group, currently uses Rabbit's SNA gateway and gave it high marks. Just 1½ years ago, Backa's installation, which sought terminal sessions, the ability to send and receive file transfers and access to high-level application programming interfaces, could only find one product with that level of functionality — Rabbit's gateway. Since then, IBM, Digital Communications Associates, Inc. and other vendors have introduced similar products.

3+SNA provides each PC user with concurrent access to up to eight host sessions, one Microsoft Corp. MS-DOS session and one notepad session. 3+SNA also provides a choice of file transfer capabilities and host access at speeds of up to 56K bit/sec., the vendor said.

A replacement for 3Com's 3+3270, 3+SNA offers display and other 3270 features, including emulation of IBM remote communications devices such as 3270 control units, displays and printers.

Pricing for 3+SNA is $4,995 per gateway with 32 concurrent sessions. An application programming interface option costs $395. Both are available now.

Two other add-on features are slated to be available late this summer.

You needn't pay tomorrow for the bargain you buy today.

Shopping for price is a fact of life in the computer business. But money saved today can be lost tomorrow.

Fortunately, NYNEX Business Centers offer a smart answer. We sell a wide range of PC equipment and software from the best manufacturers. This allows us to objectively recommend a variety of solutions for your needs.

The answer is NYNEX.

NYNEX Business Centers offer competitive prices on a complete range of products from leading manufacturers, including IBM,® Apple® and COMPAQ.®

We back the systems and software we sell with training, service and local support.

We offer complete financing alternatives including leasing.

For the NYNEX Business Center nearest you, call toll free:

1-800-346-9X9X

extension 4085.

But most important, we offer many key elements which define the difference between a "deal" and a real value. Things like systems engineering support, comprehensive training and pretesting of software and equipment.

All at a price that's enviable by any standard.

So the next time you're looking for a bargain, be sure to contact your NYNEX Business Center representative. Because we can save you money now as well as in the future.

NYNEX Business Centers

Where business is headed.

IBM, COMPAQ, and Apple are registered trademarks of International Business Machines Corporation, COMPAQ Computer Corporation, and Apple Computer, Inc. respectively. NYNEX is a mark of NYNEX Corporation. © 1988 NYNEX Business Information Systems Co.

Prime solid, but high end dips

NATICK, Mass. — Prime Computer, Inc. reported solid first-quarter earnings and revenue gains last week but said it experienced a slowdown in U.S. sales of high-end systems.

Prime's financial report reflected the downturn in domestic minicomputer demand felt by competitors Digital Equipment Corp. and Wang Laboratories, Inc. "Our U.S. order rate remained sluggish as we experienced delays in closing high-end system sales," Prime President Joe M. Henson said in a statement.

But overall, Prime earned analysts' praise for the efficient consolidation of Computervision Corp. Prime took a $4.5 million, or 9 cents per share, charge from restructuring, but that was more than offset by a $6 million onetime gain from accounting changes.

Profits, including a onetime net gain of $1.5 million, rose 22% from year-earlier results to $14.5 million. Revenue, including Computervision results for the first time, was $363.7 million, compared with $221.7 million in first-quarter 1987.

"Revenues were a little light, but they did more on the expense side than I estimated, so the bottom line looked good," said First Boston Corp. minicomputer analyst Susie Peterson.

CLINTON WILDER

Lautenberg tries for second term

JERSEY CITY, N.J. — Sen. Frank Lautenberg (D-N.J.), cofounder of Automatic Data Processing, Inc., last week announced his bid for election to a second term.

Lautenberg is expected to easily outdistance two relatively unknown opponents in the Democratic party primary June 7. He will face stiff competition from expected Republican nominee Pete Dawkins, a retired U.S. Army general who recently moved to New Jersey.

In a speech kicking off his campaign, the former ADAPSO chairman enumerated his accomplishments in his first term, including contributions made to the information technology industry.

The senator spoke of his legislative actions to protect American-made technology from infringement by foreign concerns and a bill, currently awaiting the president's signature, to provide computer training in schools.

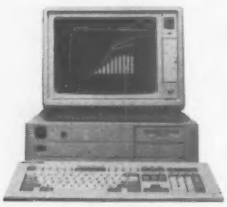
"Protecting our ideas, our inventions and our patents means protecting our jobs and our workers, our scientists and their families — everyone whose future is tied to American ingenuity," the senator said.

"The law I wrote to protect those inventions has helped, but I want to do more," he said.

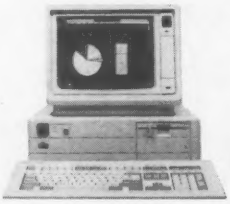
ALAN ALPER

Tandy Computers: Because there is no better value.™

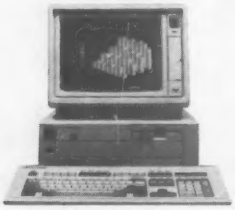
Tandy Business Solutions



Tandy 4000



Tandy 3000



Tandy 3000 HL

Tandy 1400 LT

Tandy 1000 TX

Tandy 1000 SX

Design your system around the broadest selection of PCs in the industry.

Tandy Computers are the best-selling IBM® PC compatibles in America. From the latest Intel® 80386 technology and highly expandable Intel 80286 systems to portables, we have it all. What's more, we offer the system solutions your business can depend on for years to come.

Workgroup Solutions. Our 3Com® workgroup lets people and PCs work together, so your entire office can share information and route messages—electronically. And with IRMALAN™, up to 32 people in your workgroup can access an IBM mainframe.

Multiuser Solutions. We've logged more years of experience with XENIX® multiuser systems than anyone. And we offer SCO™ business productivity software that's designed expressly for multiuser efficiency.

Total Support. Radio Shack Computer Centers offer the most comprehensive range of support services in the industry. The bottom line? We work hard for your business!

Send me a 1988 computer catalog.

Mail to: Radio Shack, Dept. 88-A-552
300 One Tandy Center, Fort Worth, TX 76102

Name _____
Company _____
Address _____
City _____ State _____
ZIP _____ Phone _____

Radio Shack®
COMPUTER CENTERS
A DIVISION OF TANDY CORPORATION

Intel/Reg. TM Intel Corp. 3Com/Reg. TM 3Com Corp. IRMALAN/TM Digital Communications Associates, Inc. IBM/Reg. TM IBM Corp. XENIX/Reg. TM Microsoft Corp. SCO/Reg. TM The Santa Cruz Operation.

Gene Amdahl

CONTINUED FROM PAGE 1

The machine will be based on very large-scale integration technology and incorporate high-density CMOS chips. "What we're trying to do here is use a technology that is extremely inexpensive compared with what IBM uses," said Bob Nuckolls, a former Trilogy engineer and now vice-president of systems development at Andor.

"We're going for the low end [of the mainframe market] because that's where we can build a machine that has the highest margins. IBM has its highest margin on that machine, too," Nuckolls said. "It's the most lucrative part of the market."

Safe bet

This argument has lured a first round of investors, despite Amdahl's economic disaster with Trilogy in the early 1980s. That company squandered nearly $100 million trying to develop wafer-scale integrated circuits and mainframes designed to outpower IBM. After scrapping those projects, it was absorbed by San Jose, Calif.-based Elxsi, Ltd. in 1987.

Amdahl said he raised $2 million in the first 18 months for Andor, which was formed last June. The money came from an India-based holding company, a U.S.-based holding company and "all sorts of businesses," he said.

Amdahl said he has yet to begin tempting investors into a second round of funding. Referring to potential venture capitalists, Amdahl would only say, "I haven't heard any disinterest from anybody."

The lack of early commitment may not be a major hurdle, according to Jay P. Stevens, an analyst at Dean Witter Reynolds, Inc. in New York. "He's not looking for all that much money," he said. "I think he's got a chance."

Amdahl said Andor's relationship with IBM is cordial, despite the fact that he is looking for an inroad into IBM's market share. He said he sticks to plug-compatible machines, "because if you want to mine gold, you mine the mother lode."

Amdahl is shying away from direct competition with Amdahl Corp. by supporting a computer below the power levels of that company's mainframe line.

Andor will stay out of trouble with IBM by working out a cross-licensing deal, Amdahl said. "It's easier to pay whatever royalties are required, even if you don't infringe on them.

"We will be a mosquito on the side of IBM. But we hope to be one that's satiated with blood."

DB2 DESIGN & DEVELOPMENT FOR PERFORMANCE

Resources are too valuable to waste, both yours and mine. You want excellent performance in your DB2 applications and I want to provide you with the information you need to accomplish this on one page in Computerworld.

Receive high quality seminars, design reviews, and consulting while avoiding the high cost of large office staffs, layers of management and bulk mailings (this is the only ad you'll see).

1. **DB2 Concepts and Facilities**
   - DB2 Usage Architecture
   - The SQL Language
   - DB2 Objects
   - The Optimizer
   - Security & Authorization
   - The Catalog Tables
   - DB2 System Architecture
   - DB2 Address Spaces
   - Monitoring & Tuning Applications & DB2
2. **Review of Normalization**
   - What is Normalization
   - Update and Delete Anomalies
   - First, Second, and Third Normal Form
   - When to Consider denormalization
3. **Creating Databases, Tablespaces & STOGROUPS***
   - The use of VSAM & Storage Groups
   - Creating Tablespaces & the Impact of Parameters on Performance
   - Partitioned Table and Index space
   - Table and Index Space Percent Free
   - Estimating Table and Index Space
   - Using SPUFI to Create Objects
4. **Creating Tables, Indexes & Views***
   - Creating Tables
   - Data Types and Lengths
   - Null, Not Null, & Not Null with Default
   - EDITPROC, FIELDPROC, & VALIDPROC
   - Creating Indexes
   - The Value of Views & Limitations
5. **Indexing for Performance**
   - Overview of Indexing
   - Analysis of Data Usage to Determine Appropriate Indexing
   - Advantages of a Clustering Index
   - Columns which Should & Should not be Indexed
   - Unique and Composite Indexes
   - Estimating the Distribution of an Index
   - Selects which Access Index Pages Only
6. **Using the SQL Data Manipulation Language***
   - Predicates — BETWEEN, IN, LIKE, OR, NULL, NOT
   - The Use of Aggregates
   - ORDER BY, GROUP BY, and HAVING
   - DATE/TIME Extraction and Calculations
   - String Functions
   - Joining Tables
   - Union/Intersection/Difference
   - Subselects with Multiple Levels of Nesting
   - INSERT, UPDATE, and DELETE Statements
7. **Using QMF for Application Development**
   - QMF Objects: QUERY, FORM, PROC, PROFILE, DATA
   - Temporary Storage Areas
   - Managing Objects with Commands
   - SAVE, LIST, DISPLAY, RUN, & PRINT
   - Importing & Exporting Objects
   - Updating data with QBE
   - Running a QUERY and PROC in Batch
8. **Concurrency Control and Performance**
   - The Need for Concurrency Control
   - Share, Update, Exclusive and Intent Locks
   - Lock size and Type Determinants
   - CS and RR Isolation Levels
   - When Locks are Acquired & Released
   - Commit in TSO, IMS & CICS
   - Maximizing DBD and Catalog Availability
9. **Relational Integrity**
   - Entity Integrity
   - Referential Integrity
   - INSERT/DELETE/UPDATE Rules
   - Example SQL for Implementing Rules and Cross Checking
   - User-Defined Integrity
10. **Program Development — Embedded SQL**
    - Embedded SQL
    - Cursor Management
    - Continue Processing after a Commit
    - SQL Communication Area
    - WHENEVER Statements
    - Batch Processing
11. **Program Preparation & Execution***
    - Program Preparation & Execution Flow
    - Application Plans & the EDM Pool
    - DCLGEN & Precompile Process
    - Bind & Rebind Process
    - DSN Command Processor
    - Program Execution
12. **Programming for Performance**
    - Dynamic SQL in Production Systems
    - Efficient Joins on Large Tables
    - The Use of Indexes with Update
    - Functions that Require Sorted Rows
    - OR, LIKE, & NOT Use of Indexes
    - Data Type Affect on the Use of Indexes
    - Composite Index Scans
    - Predicates that Can & Cannot Use an Index
13. **Optimizer Automatic Access Path Selection**
    - Parse, Optimize, Code Generation, and Execution
    - Sargable and Non-Sargable Predicates
    - Calculating Filter Factors
    - Evaluation of Predicates and Subselects
    - Methods Used in Joining Tables
    - Cost Formulas
14. **Determining the Access Paths Chosen by the Optimizer***
    - Getting Information on the Paths Chosen
    - Analyzing the Plan Table
    - How EXPLAIN is used
    - Plan-Table Explanation
    - Sample Explains of Join, Subselect, Union, & Locks
15. **Efficient and Effective Use of the Utilities***
    - Overview of Utilities & Concurrency
    - Loading & Reloading Data
    - The Importance of RUNSTATS
    - When & How to Reorganize
    - Expanding & Contracting Space
    - Application Data Backup & Recovery
    - Determining Status & Restart
16. **DB2 Security and Authorization**
    - Administrative Authorities
    - Table Privileges
    - Views as a Security Mechanism
    - Plan, Subsystem, Database & Use Privileges
    - Revoke Cascade & Affect on Objects
    - Centralized/Decentralized Control
    - Security with TSO, CICS, & IMS Attach
17. **Major DB2 System Components — Part I**
    - DB2 System Architecture
    - Thread Creation
    - Environmental Descriptor Manager
      - Skeleton Cursor Table Template
      - Cursor Table
      - Data Base Descriptor
18. **Major DB2 System Components — Part II**
    - Buffer Management
      - Size of Buffer Pools
      - Buffer Pool Searching
      - Asynchronous Prefetch & Write
    - Log Management
      - Writing Log Records
      - Checkpoint Processing
      - Archiving the Log Data Sets
    - Evenly Distributed I/O
    - Monitoring & Tuning
    - Steps in DB2 Processing a Request
19. **Monitoring and Tuning Using the Catalog Tables***
    - Population of the Catalog Tables
    - DB2 Use of the Catalog Tables
    - Sample Selects are provided for:
      - DBA & Programmer/Analyst Use of the Catalog Tables
      - Table, Index, & Plan Considerations for Performance
      - Considerations for Reorganization
      - Space Management
      - Determining Function & Object Privileges
      - Documentation Using the Catalog Tables

Seminar Development and Enhancements

The DB2 DESIGN & DEVELOPMENT FOR PERFORMANCE seminar has been developed, refined, and revised for each release of DB2 and updated based upon the input of over 1,000 seminar attendees over the past three years by Gabrielle. Version 2 announcement has been added to the seminar.

The book "DB2 DESIGN & DEVELOPMENT GUIDE" by Gabrielle Wiorkowski and David Kull has been written based upon the seminar and is available from Addison Wesley by calling 1-800-447-2226.

Inhouse Seminar Offerings

$1495 is the cost of the seminar per day with up to 15 professionals at your company site customized to meet your requirements. (Sections with workshops available are indicated by an "*" in the outline). Each professional over 15 is charged at $100 per day (compare with typical charges of $200 to $300 per day.)

Licensing of the seminar material for inhouse training programs is available for $15,000. Excellent choice if you plan to train more then 30 professionals.

Public Seminar Offerings

$1495 is the cost of the week long seminar in the following locations and dates:

Dallas on June 6-10 New York City on July 11-15 Denver on August 8-12

CALL (214) 690-0370 or mail form with fee and save $100

Name _____

Company _____

Street _____

City, State, Zip _____

Telephone ( ) _____

DB2 Performance, P.O. Box 796815, Dallas, Texas 75379 (214) 690-0370

EDITORIAL

Age of integration

NEWS FLASH: The electronic publishing industry declared its commitment last month to design products targeted at improving information management and integrating them with existing corporate information systems.

Surprised? Probably not.

As every information systems executive knows, the long-term success of new technologies relies mainly on the ability to coexist with and improve upon the corporate information infrastructure. Although revolutionary technologies can produce quick fortunes for entrepreneurs, Fortune 500-type success comes only to those vendors able to go beyond a focus on individual users and concentrate on serving corporate structures. That's why personal computer vendors are increasingly allying themselves with networking technologies, LISP workstations are facing a stagnant market and optical products vendors still await the breakthrough that will bring customer commitment.

As indicated in our Spotlight report on electronic publishings systems [CW, April 25] and observations at the recent Corporate Electronic Publishing Systems show in Chicago, the electronic publishing industry appears to be waking up to those real-world realities. As David Henry Goodstein, CEPS chairman and president of Interconsult, Inc., put it so well, the industry wants "to get beyond the shimmering goal of WYSIWYG" — that tongue-tripping acronym conveying that What You See on your monitor Is What You Get on your printout — "and decide that electronic publishing is all about information management."

Information systems executives, therefore, have reason to rejoice. Rather than focusing solely on desktop presentation products, successful purveyors of publishing systems will focus mostly on what American businesses need and want. In business today, rapid change and cutthroat competition demands that more and more individual employees and work groups be tied into cohesive networks of compatible computer products.

The publishing industry has come to this battleground along two flanks: the PC-based standalone solution on the one hand and the minicomputer-based, proprietary multiuser solution on the other. Presumably, they will meet somewhere in the middle, using standard hardware platforms and standardized connectivity protocols to allow printing to join the information management mainstream.

So the marketing focus — and none too soon — now moves away from selling individual users on the latest wonders of a new font cartridge and toward the crucial issues of networking, distributed data base management systems and, somewhat ironically, the pros and cons of tying into centralized corporate data bases, the mainstay of the much-maligned mainframe.

LETTERS TO THE EDITOR

Recruiters defend their profession

Anthony Reed's article, "When the headhunter calls" [CW, April 4] began with some dime-store advice and ended with a stab in the back to headhunters.

Reed is not a recruiter. Nor was there any mention that he had any special qualifications for his "expert advice." If Reed had an ax to grind, why allow him to use *Computerworld* to spread his innuendos about "unscrupulous" headhunters? There are numerous professional search firms that could offer more appropriate and experienced advice.

Has the headhunter become the new whipping boy? I have no guilt in helping qualified data processing professionals better their careers. Do I get paid a commission for placements? You bet I do. I earn those fees and do my job with care and conscience. As the same issue pointed out in a survey of 370 systems organizations, search firms were found to have the highest degree of success for recruiting staff.

John Malinoski
Data Processing Recruitment
Gilbert Lane Personnel Service
Hartford, Conn.

Anthony Reed's article contained some practical advice about working with recruiters.

The author also revealed a number of unscrupulous tactics that have been used by unethical recruiters and by equally unethical employers.

The problem with his article was that in trying to differentiate between the good and the bad, examples of recruiter behavior were given that could be confusingly attributed to any recruiter. The use of generalized illustrations painted an unfair picture.

Professional recruiters are competent people who act with honesty and integrity and are dedicated to providing a valuable service to client companies and candidates. They are committed to establishing long-term business relationships, and this can only occur by adherence to sound ethics. Unfortunately, there are some less-than-desirable recruiters, just as there are ill-mannered and untrustworthy members in all occupations. It is, however, unprofessional to negatively stereotype every individual within an occupational group.

Marc L. Blessing
Director
Compusearch
Cleveland

Anthony Reed immediately set a prejudicial tone in his article by calling executive search consultants "headhunters." Yes, the slang name has been used, but it is no more accurate than calling Reed a "hacker."

Good executive search consultants are in their profession for the long run. Many are not paid commission, as Reed stated, but receive salaries and year-end bonuses. Whether or not they place a specific candidate, therefore, is not nearly as important as making the correct match.

The most cogent point Reed made was that there must be mutual trust between the candidate and search consultant. Yet Reed also advised the systems professional to do everything but trust the search profession.

If Reed wanted his audience to trust his arguments, he should have proved his points with tangible evidence. Instead, his article read like one that comes from someone who may have a personal gripe with one person but no real substantial proof to make any of the unfair and erroneous allegations that he made.

Sheryl Kay
Director of Technologies
Criterion Executive
Search, Inc.
Tampa, Fla.

Anthony Reed's article advising what to do when the headhunter calls made a few good suggestions but spent more time promoting an adversarial relationship between systems professionals and recruiters.

Does it make sense to be abrupt to someone who is calling to offer you an opportunity to earn several thousand dollars a year more and be trained in and work with new technology just because they initiated the telephone call?

Does it make sense to talk about the few circumstances where someone from your own shop will pretend to be a recruiter in order to trap an employee without saying that if management is crazy enough to do that you should consider changing jobs?

Recruiters help staff a number of programming, systems and management positions every day. Perpetuating mistrust, as this article did, is a disservice.

Jeff Altman
Jeff Altman & Co.
New York

Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.*

Getting in on standards

Users will help shift the focus to testing for product compliance

JOHN L. BERG

Don't take your eyes off computer standards. They face changes as dramatic as those happening in other areas of the information industry. The changes will affect corporate expenditures amounting to billions annually and will make or break many new (and old) products.

Yet judging from the discussions at the IEEE's biennial Computer Standards Conference in Washington, D.C., those closest to making standards may be the least aware of the changes or their importance.

At one time, the process that led to formal national and international standards involved gathering the interested parties that argued, politicked and compromised until they produced a document. Then they published the standard so the world could implement it. Other than periodic reviews, this publication ended standardization.

No more. Open Systems Interconnect now leads the new wave with its requirement for certification. Simply stated, specific products must prove they comply with the standard specifications.

The demand for certification, led by major users, is so beneficial to smaller users and niche vendors that their combined support has resulted in the mushrooming of third-party testing groups around the world. This demand will shift attention away from making the specification to testing a product's compliance.

Howard Yudkin, chief executive officer of the new Software Productivity Consortium and keynote speaker at the recent Compstan 88, states that future software productivity will depend on widespread availability of software modules.

These modules, as listed in parts catalogs, will permit off-the-shelf software pieces to be readily assembled into systems. Yudkin adds that certification of each module's interface was essential to the acceptance and use of this approach. Yet he also noted that it was irrelevant whether the specification was produced by formal standards groups.

I see two possible futures for standardization. In one, standard specifications will come from many — now unlikely — sources. In the other, the testing and certification of a standard will become the important, operative step.

Bull by the horns

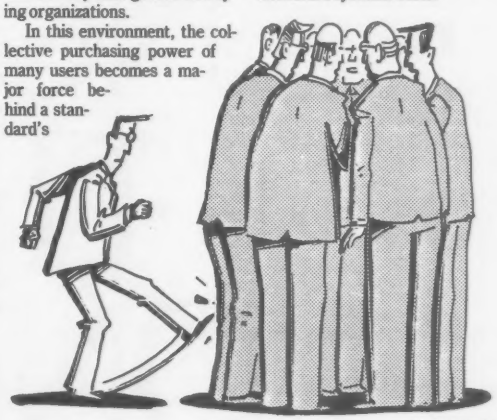
The first scenario is already upon us in some ways: Users dissatisfied with the slow progress of today's standards are working around the process. The IEEE produced Posix as a publicly owned equivalent of the proprietary Unix operating system. It is also trying to standardize the IBM Personal Computer bus. We will see other groups taking similar action.

ANSI's inflexible thinking about the current standardization process may be the major problem for these groups to overcome. Foremost among user criticism of standardization today is the interminable duration of the process.

In the second scenario, certification will become the working edge of standardization. Consider the intermediate steps:

- Validation asserts that a product has been found to comply with all or specific subsets of the standard. This service is now provided for certain compilers in the U.S., Europe and Japan.
- Certification puts the tester's reputation behind the testing and reflects some degree of liability for the certification claims.
- User procurements habitually specify certified products. Like the Underwriters Laboratory "UL" tag, a certification mark will enhance a product's value and obliterate competitive vapor standards.
- The insurance industry offers new policies to share certification liability and guides certifying organizations.

In this environment, the collective purchasing power of many users becomes a major force behind a standard's acceptance and enforcement. Testing becomes the concrete embodiment of the standard specification, and its reproducible results can be used at any time to demonstrate compliance.



PETER KUPER

IBM and others have long considered standards a business, not a technical, decision. Compstan 88 speakers from DEC and Wang note the benefits of supporting global standards in their companies and to their users.

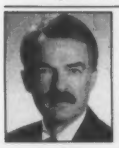
It is high time that users also see standards as a critical business decision. Vendors and users should grasp the current opportunities to manage, not simply accept, the standards that could directly determine their present and future systems costs.

Berg consults in strategic, technological and competitive edge planning from Long Lake, Minn. He is editor in chief of *Computer Standards & Interfaces* and serves on the planning committee of the 1989 International Conference on Standardization.

Are top execs drowning in data? SIC it to 'em

Strategic centers transform information into a lifeline to reach corporate objectives

JOHN KIRKLEY



MIS managers take heed: Your company's senior executives are drowning in a sea of data.

And where are you? Are you ready to throw them a life preserver? Or are you down in the bowels of the ship shoveling coal into an IBM 3090, deaf to their frantic cries?

One of the people examining the strategic use of information is Michael Gauthier, a principal at management consultant firm Temple, Barker & Sloane, Inc. in Lexington, Mass.

"MIS is almost never involved," Gauthier says, when asked about the collection and presentation of strategic competitive information.

MIS managers seem to be comfortable dealing with quantitative information, but they shy away from the more ambiguous world of qualitative data — the world of images, abstractions, opinions, ideas, suppositions and conjecture.

The trouble is that, once again, technology has presented MIS with new challenges. Advances in optical media, communications, the speed and power of personal computers, as well as the rapid spread of end-user literacy, have unleashed a wave of creative information consumerism among the user community.

The power and bandwidth is there to handle this flood of unstructured data. But somebody has to pull it all together into digestible form.

What these decision makers need, Gauthier says, are systems that integrate external qualitative data and internal data processing information. How to go about this integration leads Temple Barker to contribute yet another acronym to the industry's lexicon: the SIC, or strategic information center.

These centers coordinate research efforts with corporate objectives. As specialized units, they perform specific in-depth research and provide analytic services that prepare the data they gather for their top-management clients. Often, the SIC works in conjunction with existing corporate library services, which provide data from standard reference sources.

Not just a pipe dream

Gauthier says several SICs already exist. E. F. Hutton has put together a corporate war room, where executives gather comprehensive information on their clients, such as demographics, product lines and management changes. Just one of the many uses of this data is to alert Hutton's sales force to opportunities to sell new products to their existing customer base.

The war room also keeps tabs on Hutton's competitors by tracking Securities and Exchange Commission filings and using information purchased from outside research services to scan the top corporations on their target account lists.

"Technology has made it possible to collect new categories of information, particularly nontextual, qualitative information," Gauthier says. For example, using optical technology, data bases of images can now be gathered, a capability already being exploited by advertising agencies.

Suppose your agency needed a picture of 10 typical yuppies for an ad layout. It's there in the data base: Ten yuppies at the push of a button.

Another service some SICs provide is to coordinate the purchase of research materials. You know what I'm talking about: those bulging three-ring binders (and the plastic-covered update pages that nobody ever gets around to inserting), the newsletters, the bulletins, the handsomely bound reports.

These services are not cheap, and although the information provided may be very useful, it is often not used properly.

Gauthier cites the example of one client who spent $7 million a year on research materials. In a fit of cost-consciousness, management checked through the company and failed to uncover the massive investment — most of the materials had disappeared into some corporate black hole.

Such research contains a wealth of data that a SIC can transform into concise, fertile information — information that a senior executive can use to make critical decisions.

However, before cobbling together a SIC for your company, Gauthier recommends you find out first just how smart your company wants to be. How much data does top management want and need about its competition or its marketplace? It could be that your managers are quite happy with the present corporate IQ and will cast a cold eye on any attempt by MIS to raise it.

But if the need is there, the opportunity exists for MIS directors to add a new dimension to their traditional role of processing quantitative information for the corporation. It doesn't matter what it is called — strategic information center, war room, competitive analysis center.

Like new glasses

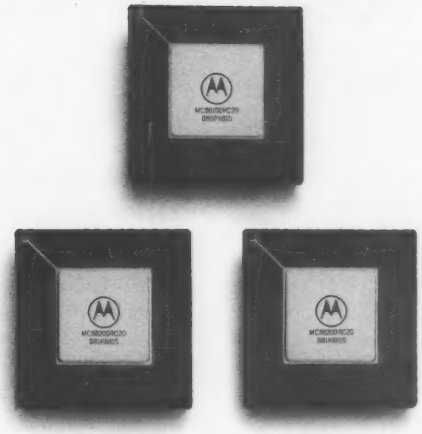
The point is that the SIC concept focuses yours and your management's attention on gathering, analyzing and presenting key strategic information in ways that MIS has never been involved with before.

Within your own organization, there probably exist rich pockets of information just waiting to be coordinated by an MIS department that views its function as something much more broad than being an adjunct to the accounting department.

So, when you next hear your top management's faint cries for help as another sea of data washes over them, rush to the rail and heave that life preserver. In the last analysis, the life you save may be your own.

Kirkley is a computer industry writer, editor and consultant based in Warwick, N.Y.

FROM NOW ON, THERE'S ONLY ONE RISC* WORTH TAKING.



INTRODUCING THE MOTOROLA 88000 MICROPROCESSOR FAMILY: THE GREATEST RISC OF ALL.

The future of RISC computing has been reduced to three small, but amazingly powerful chips.

Namely, the Motorola 88000 family.

One awesome microprocessor unit, supported by two cache memory management units. Designed to take RISC architecture far beyond anything else in the marketplace.

The 88000 runs at a blistering 14-17 MIPS, 7 million floating point operations per second, and an incredible 50 MIPS in parallel processing applications (using just four 88000 chip sets on our HYPERmodule™ card).

Which makes everything from multi-user business systems to fault tolerant on-line transaction processing systems to artificial intelligence systems several times faster and more powerful than ever before.

What's more, it comes with absolutely every bit of hardware and software needed to build your system of the future, today. In fact, many leading hardware and software companies, including those in the independent consortium 88open, are already designing systems around the 88000. And many more will follow.

So make sure your future is as rewarding as it can possibly be. Call us for more information at 1-800-441-2447. Or write Motorola Inc., P.O. Box 20912, Phoenix, AZ 85036.

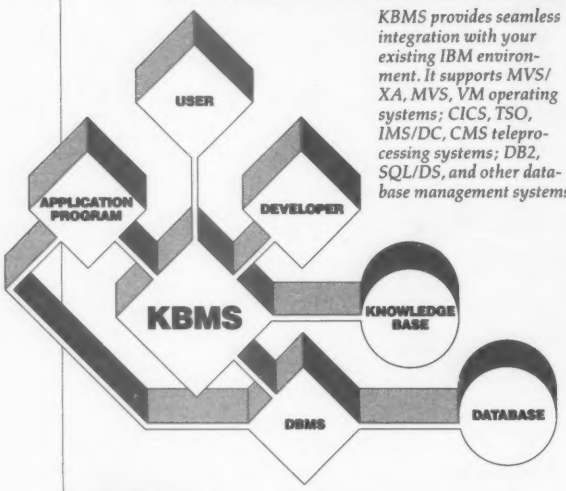
Because the greater the RISC, the greater the reward.

MOTOROLA

*Reduced Instruction Set Computer

© 1988, Motorola Inc.
HYPERmodule is a trademark of Motorola Inc.

INTRODUCING KBMS.®
THE FIRST KNOWLEDGE BASE SYSTEM FOR PRODUCTION APPLICATIONS.



KBMS provides seamless integration with your existing IBM environment. It supports MVS/XA, MVS, VM operating systems; CICS, TSO, IMS/DC, CMS teleprocessing systems; DB2, SQL/DS, and other database management systems.

KBMS

A major computer company is saving over $25 million a year on product ordering and configuration, thanks to expert systems they developed in-house.

A leading financial services company has substantially reduced bad credit losses with a computerized system they developed based on artificial intelligence.

These are true stories. Yet expert systems still have not taken a serious place in the business world.

Why? Because they've been available only on specialized systems using esoteric languages like LISP and PROLOG. So, like the companies described above, you could only benefit from knowledge-based systems if you had a great deal of money, people and time to make them work.

Until now.

THE PRACTICAL BREAKTHROUGH: FULL INTEGRATION WITH IBM AND DATABASE SYSTEMS.

Now AICorp has developed a knowledge base management system called KBMS that is ready to take its place –along with database management and fourth-generation languages–as a major competitive business tool.

KBMS is a mainstream software system that is an extension of conventional DP practices. It provides seamless, high-level integration with your existing applications and databases.

The system runs under major IBM operating systems, teleprocessing systems and database management systems. It can be integrated with your existing applications by calling a KBMS module from a standard COBOL program, or vice versa. It even has the speed and processing power to be used in high-volume, transaction processing applications.

Perhaps most important of all, you can implement KBMS using the experience, hardware and software investment you have in place already.

IMPLEMENT A NEW CLASS OF APPLICATIONS.

KBMS makes it possible for you to develop practical solutions for whole new applications areas–applications that are strategic and crucial to your business, but simply have been too complex to solve with traditional, procedural programming approaches.

For example, manufacturing companies can use KBMS to build an expert system for reviewing every incoming order for proper configuration. Insurance companies can use it for underwriting decisions to guarantee that corporate policy is always followed. Energy generating companies can use it to better predict energy needs. And financial organizations can use KBMS to enforce credit approval guidelines.

Any business problem that is complex, governed by many interrelated rules and policies, and subject to frequent change is a candidate for KBMS.

HOW KBMS WORKS.

KBMS, which stands for Knowledge Base Management System, incorporates the four key techniques of AI programming methodologies: goal-directed reasoning (backward chaining), data-driven reasoning (forward chaining), hypothetical reasoning, and object-oriented programming.

By combining these techniques in one integrated system, KBMS gives your business applications the full "reasoning" power of expert systems technology, allowing you to address a wide range of applications with a single product.

A FREE EXECUTIVE GUIDE.
CALL (617) 890-8400.

AICorp, the supplier of the INTELLECT™ natural language system for the IBM mainframe environment, has prepared a free booklet, "An Executive Guide to Knowledge Base Systems." The booklet explains how knowledge base systems work, and how they can help you achieve a measurable, significant and immediate return on investment for your company.

For your free copy, call AICorp at (617) 890-8400. Or write AICorp, 100 Fifth Avenue, Waltham, MA 02254-9156.

AICORP

Bringing AI Software to Business

AT LAST.
A PRACTICAL KNOWLEDGE BASE MANAGEMENT SYSTEM FOR YOUR IBM MAINFRAME ENVIRONMENT.

KBMS is a registered trademark and INTELLECT is a trademark of AICorp, Inc.

SOFTWARE & SERVICES

SOFT TALK

Jean S. Bozman

Learning to live with DB2

Around BUG, the BMC Corp. users group that met in Houston two weeks ago, an IBM shop earned the title "robust" when it had successfully applied IBM's DB2 relational DBMS to production applications.

"Out of every 10 users, one is a robust shop," says Jack Olson, a manager of DB2 product development at BMC, which writes DB2 system software utilities in Austin, Texas. "It takes about 18 months to become a truly robust shop. The learning curves are very steep, and there's no way to buy the experience. You have to develop it in-house."

Olson should know. A former IBMer, he has been working with DB2 customers ever since IBM shipped DB2 Release 1.0 in 1985. So far, there have been relatively few "robust" shops nationwide, BMC managers say. Among the few are Amoco in Chicago, Flying Tigers air freight in Los Angeles and Texaco — which has more than 400 production DB2 tables. But most of the DB2 shops Olson sees are still learning — and roughly half of those have less

Continued on page 26

Harrison leaves sturdy Workbench

BY CHARLES BABCOCK
CW STAFF

FALLS CHURCH, Va. — Richard G. Harrison, organizer of the federal Programmers Workbench, has stepped down, and Rand Information Systems, Inc., which supplies the underlying platform for tying together the workbench tools, has filed for bankruptcy.

Some say it is fitting testimony to Harrison's organizing ability that the two events will have little impact on the workbench. Thirty-six federal agencies purchased the workbench or components of it in its first year of existence at an average price of $150,000, and another 11 have purchased it so far this year.

Recent buyers include the Defense Logistics Agency, the Office of Personnel Management, the Air Force Logistics

GSA's Harrison

Command and the Social Security Administration. An estimated 5,500 programmers in the federal government are now workbench users.

When he became director of the General Services Administration's Federal Software Management Support Center four years ago, Harrison seized on a tentative, pilot workbench in use in part of the center and filled it out. Formerly in the tools business himself, he talked to private vendors and urged them to submit bids on their products for a workbench tied together by a common menu and user interface.

It was a move that someone speaking for the federal government could execute, but one that the vendors were unlikely to collaborate to make on their own.

"It was hard to dampen the competitive spirit. We would have meetings in which no one would want to say anything. They didn't want to talk about their products in the same room with their competitors," Harrison recalled.

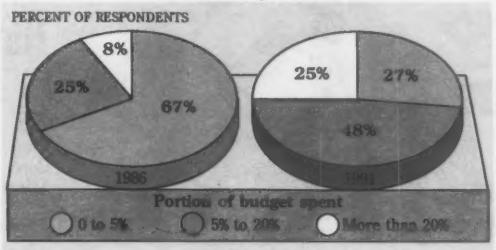
The 10 products on the workbench represent a Cobol mainte-

Continued on page 24

Data View

Opening packages

Japanese MIS managers, who used to turn up their noses at everything but in-house development, plan to spend more on packaged software by 1991



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

Expert system offers advice on MVS events

PRINCETON, N.J. — A continuously running system that is now available on a personal computer is said to offer human expert-style assistance in analyzing MVS and recommending appropriate responses to problems.

Mindover MVS from Applied Data Research, Inc. is not a replacement for in-house MVS expertise, but it can assist MVS

Continued on page 26

MSA refines product lines

Users applaud sharper manufacturing focus

BY ROSEMARY HAMILTON
CW STAFF

ATLANTA — Management Science America, Inc. (MSA) recently presented its manufacturing subsidiary with a clear agenda for the first time in two years.

While the picture has a sharper focus, it will also take years before the plans become products available in the marketplace. Nonetheless, MSA won approval last week from users, who say what counts is that MSA is on the right track.

"I sense they are taking the bull by the horns in the manufacturing area," said Matt Perri, director of MIS at BASF Corp. "I've been watching what they're doing, and it doesn't make me nervous."

Representing 40% of revenue, manufacturing software is a critical piece of MSA's business. During the past two years, the company has reshaped and rede-

Continued on page 25

Inside

- Computer Associates designs graphics tool said to link devices. Page 24.
- Object-oriented pioneers introduce DBMSs for commercial market. Page 25.
- V. I. Corp. enhances Dataviews graphic software products. Page 27.

ZERO DEFECT PRODUCTION CONTROL

OVER 200 DP MANAGERS HAVE COMMITTED TO THE GOAL OF "ZERO DEFECT" QUALITY CONTROL . . . HAVE YOU?

■ *ZERO DEFECT PRODUCTION CONTROL*

Means that no incorrect results get past your Data Processing quality control net. This requires fewer processing errors to start with and positive detection of those that do occur. A tall order. . . . but BETA Systems is helping to achieve it in over 200 MVS installations.

■ *BETA 91 - AUTOMATED BALANCING & QUALITY MANAGEMENT SYSTEM*

"The most automated production verification tool in existence." BETA 91 provides a standardized interface to automate batch verification and balancing procedures. It can scan existing reports, or be called from within programs to capture control totals, record counts, dataset names, or other required information. BETA 91 includes state-of-the-art features to assist in disaster recovery and an interface to UCC 11 to fully automate restarts.

BETA SYSTEMS SOFTWARE, INC.
1485 Enea Ct., Suite 1333
Concord, CA 94520
(415) 682-8715

■ *YES,* *Tell me more about "ZERO DEFECT" PRODUCTION CONTROL.*

☐ ***BETA 91***—Automated Balancing & Quality Management System
☐ ***BETA 92***—Job History & Output Management System
☐ ***BETA 93***—Report Distribution & Print Management System

NAME _____ TITLE _____
COMPANY _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____
TELEPHONE (____) _____
CPU MAKE/MODEL _____
OP SYS _____

BETA
Systems Software, Inc.

1485 Enea Ct. ■ Suite 1333 ■ Concord, California 94520 ■ (415) 682-8715

Computer Associates graphics translator links varied systems

GARDEN CITY, N.Y. — Computer Associates International, Inc. recently introduced a graphics software tool that it said will link mainframe, mid-range and microcomputer graphics and software devices.

CA-Graphics Connection is another step taken by Computer Associates to position graphics as an integral part of everyday business, the company said.

The new product serves as a graphics translator and is said to allow users to move graphics data from a variety of graphics-producing applications to a number of graphics output devices, electronic publishing systems and graphics editors.

Supports common formats

The product supports four common formats: Hewlett-Packard Co.'s HP-GL, IBM's ADMGDF, ANSI-standard CGM and Computer Associates' own Disspop. The company said it covers nearly all graphics-producing applications by supporting these formats.

With this support, CA-Graphics Connection can support such mainframe and minicomputer products as CA-Tellagraf, CA-Disspla, SAS Institute, Inc.'s SAS/Graph, SPSS, Inc.'s SPSS Graphics and Pansophic Systems, Inc.'s D-Pict.

It also allows access to such microcomputer applications as Lotus Development Corp.'s Freelance Plus, Ashton-Tate Corp.'s Draw Applause and Computer Associates' Superimage and Superchart.

CA-Graphics Connection will begin shipping this month. Initial versions were designed for the IBM MVS and VM operating environments as well as for the Digital Equipment Corp. VMS platform. Prices for the DEC platform range from $6,000 to $21,000. The IBM versions range from $11,000 to $26,000.

Adpac analyzer gives blueprint of source code

SAN FRANCISCO — A $60,000 source code analyzer and documenter is now available for PL/I programs from Adpac Corp.

Adpac has adapted its PM/SS system for Cobol source code analysis to work with the IBM-originated PL/I language. The system analyzes the structure and content of a PL/I system and documents the relationships among its components, such as data elements, data sets, copy or include books and source programs, company spokesmen said.

The PL/I analyzer, also used to perform data name rationalization, automates the cleanup of redundant data used in the population of data dictionaries. It also enforces control over naming and other programming standards.

Tells you what to do

The product tells the user "how a system is structured, what design principles were employed and the availability of documentation," said Al Vickers, sales manager.

PM/SS also interfaces to Adpac's line of computer-aided software engineering tools, DFDP and Design. It was designed to run under either MVS/SP or MVS/XA.

Adpac is a 25-year-old company that provides tools for MVS. Company spokesmen said PM/SS is in use at 120 businesses.

Harrison

CONTINUED FROM PAGE 23

nance programmer's tool kit. They include Data-Xpert from XA Systems Corp., Via/Insight from Viasoft, Inc. and Cobol restructurer Retrofit from Peat, Marwick, Main & Co.

Changed some minds

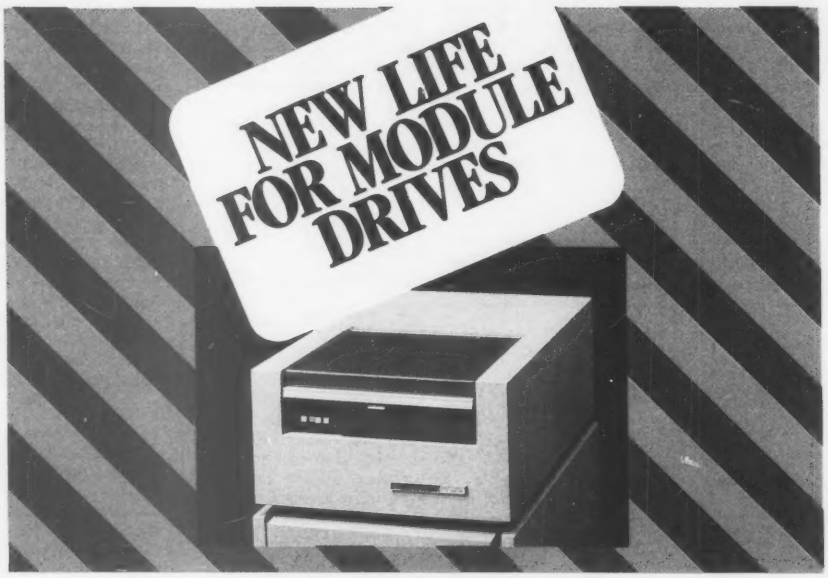
The Programmers Workbench "is a product that has changed the way we think about the maintenance programmer's task," said Richard K. Ball, director of the Software Management Institute.

"Richard [Harrison] is a man of immense intelligence, imagination and will to get things done," said Nicholas Zvegintov, publisher of *Software Maintenance News*. "The mere availability and promotion of the Programmers Workbench has changed the way the software profession looks at maintenance tools," Zvegintov wrote in the latest issue of his newsletter. Harrison was named Newsmaker of the Year at the Software Maintenance Association's conference in Toronto last year.

Harrison resigned Friday to establish a printing business with his wife in the hotel-studded suburb of Arlington, Va. After incessantly promoting the workbench, Harrison is leaving it in the hands of Diane Herdt, the center's workbench manager.

Rand Information Systems will continue to make the base configuration available as Chapter 11 reorganization begins. Center officials said the platform is an ongoing asset of the company, and Rand officials have indicated they expect to return to normal operation after creditors are satisfied.

RENEWAL NOTICE



Have your drives refurbished by the manufacturer.

Now, Storage Module Drives (SMD) and Fixed Module Drives (FMD) manufactured by Control Data for the Original Equipment Manufacturer (OEM) market can be given a new lease on life.

Add years of service to your existing subsystem, retain the convenience and flexibility of removable media and save money, too.

Having your disk drives refurbished can be easier and less expensive than you think and a better solution than purchasing a totally new storage subsystem.

WHAT YOU GET

A completely refurbished "Control Data" disk drive updated to the most current specifications, using only genuine, original manufacturer parts, thoroughly tested by factory trained technicians and recertified to meet all factory specifications.

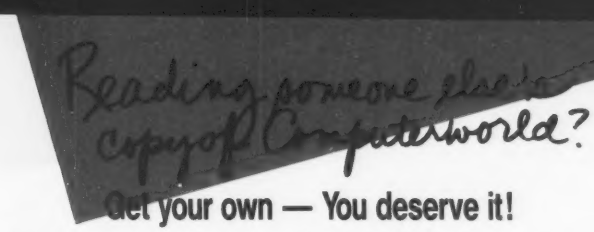
DO YOUR DRIVES QUALIFY?

Check the serial number tag on the inside of the drive. If it carries a Control Data or Magnetic Peripherals Inc. I.D. label, record the information and serial number, then call us for a free quotation. We'll give you all the details.

We also repair and refurbish many other disk drive models as well as disk test equipment made by Control Data.

Call us toll-free, 1-800-382-6060.

CONTROL DATA



Get your own — You deserve it!

YES! I want my own subscription to COMPUTERWORLD. I'll pay just $44 for 51 weekly issues — that's only 86¢ per copy. In addition, I'll receive 12 FREE issues of COMPUTERWORLD FOCUS.

FIRST NAME | M.I. | LAST NAME

TITLE

COMPANY

ADDRESS

CITY | STATE | ZIP

Address shown: ☐ Home ☐ Business

For faster service call 1-800-255-6286! In NJ call 1-800-322-6286.

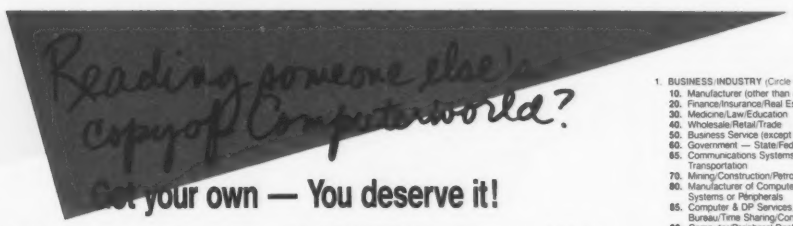
Canada, Central America & South America $110/Europe $165. All other countries $245 (Airmail). Foreign orders must be prepaid in U.S. dollars.

Please complete the information to the right to qualify for this special rate.

COMPUTERWORLD

1. **BUSINESS/INDUSTRY** (Circle one)
   - **10.** Manufacturer (other than computer)
   - **20.** Finance/Insurance/Real Estate
   - **30.** Medicine/Law/Education
   - **40.** Wholesale/Retail/Trade
   - **50.** Business Service (except DP)
   - **60.** Government — State/Federal/Local
   - **65.** Communications& Systems/Public Utilities/ Transportation
   - **70.** Mining/Construction/Petroleum/Refining/Agric.
   - **80.** Manufacturer of Computers, Computer-Related Systems or Peripherals
   - **85.** Computer & DP Services, including Software/Service Bureau/Time Sharing/Consulting
   - **90.** Computer/Peripheral Dealer/Distributor/Retailer
   - **75.** User: Other _____
   - **95.** Vendor: Other _____ (Please specify)
2. **TITLE/FUNCTION** (Circle one)
   - **IS/MIS/DP MANAGEMENT**
   - **19.** Vice President, Asst. VP
   - **21.** Dir., Mgr., Suprv., IS/MIS/DP Services
   - **22.** Dir., Mgr., Suprv., of Operations, Planning, Adm. Services
   - **23.** Dir., Mgr., Suprv., Analyst, of Systems
   - **31.** Dir., Mgr., Suprv., of Programming
   - **32.** Programmer, Methods Analyst
   - **35.** Dir., Mgr., Suprv., OA/WP
   - **38.** Data Comm. Network/Systems Mgt.
   - **OTHER COMPANY MANAGEMENT**
   - **11.** President, Owner/Partner, General Mgr.
   - **12.** Vice President/Asst. VP
   - **13.** Treasurer, Controller, Financial Officer
   - **41.** Engineering, Scientific, R&D, Tech. Mgt.
   - **51.** Sales/Mktg. Mgt.
   - **OTHER PROFESSIONALS**
   - **60.** Consulting Mgt.
   - **70.** Medical, Legal, Accounting Mgt.
   - **80.** Educators, Journalists, Librarians, Students
   - **90.** Others _____ (Please specify)
3. **COMPUTER INVOLVEMENT** (Circle all that apply) Types of equipment with which you are personally involved either as a user, vendor, or consultant.
   - **A.** Mainframes/Supermins
   - **B.** Minicomputers/Small Business Computers
   - **C.** Microcomputers/Desktops
   - **D.** Communications Systems
   - **E.** Office Automation Systems
   - **F.** No Computer Involvement

348818-6



Get your own — You deserve it!

YES! I want my own subscription to COMPUTERWORLD. I'll pay just $44 for 51 weekly issues — that's only 86¢ per copy. In addition, I'll receive 12 FREE issues of COMPUTERWORLD FOCUS.

FIRST NAME | M.I. | LAST NAME

TITLE

COMPANY

ADDRESS

CITY | STATE | ZIP

Address shown: ☐ Home ☐ Business

For faster service call 1-800-255-6286! In NJ call 1-800-322-6286.

Canada, Central America & South America $110/Europe $165. All other countries $245 (Airmail). Foreign orders must be prepaid in U.S. dollars.

Please complete the information to the right to qualify for this special rate.

COMPUTERWORLD

1. **BUSINESS/INDUSTRY** (Circle one)
   - **10.** Manufacturer (other than computer)
   - **20.** Finance/Insurance/Real Estate
   - **30.** Medicine/Law/Education
   - **40.** Wholesale/Retail/Trade
   - **50.** Business Service (except DP)
   - **60.** Government — State/Federal/Local
   - **65.** Communications Systems/Public Utilities/ Transportation
   - **70.** Mining/Construction/Petroleum/Refining/Agric.
   - **80.** Manufacturer of Computers, Computer-Related Systems or Peripherals
   - **85.** Computer & DP Services, including Software/Service Bureau/Time Sharing/Consulting
   - **90.** Computer/Peripheral Dealer/Distributor/Retailer
   - **75.** User: Other _____
   - **95.** Vendor: Other _____ (Please specify)
2. **TITLE/FUNCTION** (Circle one)
   - **IS/MIS/DP MANAGEMENT**
   - **19.** Vice President, Asst. VP
   - **21.** Dir., Mgr., Suprv., IS/MIS/DP Services
   - **22.** Dir., Mgr., Suprv., of Operations, Planning, Adm. Services
   - **23.** Dir., Mgr., Suprv., Analyst, of Systems
   - **31.** Dir., Mgr., Suprv., of Programming
   - **32.** Programmer, Methods Analyst
   - **35.** Dir., Mgr., Suprv., OA/WP
   - **38.** Data Comm. Network/Systems Mgt.
   - **OTHER COMPANY MANAGEMENT**
   - **11.** President, Owner/Partner, General Mgr.
   - **12.** Vice President/Asst. VP
   - **13.** Treasurer, Controller, Financial Officer
   - **41.** Engineering, Scientific, R&D, Tech. Mgt.
   - **51.** Sales/Mktg. Mgt.
   - **OTHER PROFESSIONALS**
   - **60.** Consulting Mgt.
   - **70.** Medical, Legal, Accounting Mgt.
   - **80.** Educators, Journalists, Librarians, Students
   - **90.** Others _____ (Please specify)
3. **COMPUTER INVOLVEMENT** (Circle all that apply) Types of equipment with which you are personally involved either as a user, vendor, or consultant.
   - **A.** Mainframes/Supermins
   - **B.** Minicomputers/Small Business Computers
   - **C.** Microcomputers/Desktops
   - **D.** Communications Systems
   - **E.** Office Automation Systems
   - **F.** No Computer Involvement

348818-6

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 55 NEPTUNE, NJ 07754

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD
CIRCULATION DEPARTMENT
P.O. Box 1565
Neptune, NJ 07754-9916

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 55 NEPTUNE, NJ 07754

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD
CIRCULATION DEPARTMENT
P.O. Box 1565
Neptune, NJ 07754-9916

Ontologic clears way for VAX-based Vbase this month

BY CHARLES BABCOCK
CW STAFF

An object-oriented data base management system, Vbase, is now available from Ontologic, Inc., and the Gemstone object-oriented system from Servio Logic Corp. is now available on Sun Microsystems, Inc. workstations.

Object-oriented systems are capable of handling data in more complex forms than other DBMSs and have been used heavily in computer-assisted design functions in which text, designs and images are frequently stored in the same file.

Vbase runs on Sun workstations and is scheduled to be available for the Digital Equipment Corp. VAX this month at prices starting at $14,900.

In Vbase, objects have three elements. "Properties" model such attributes as the size, color or cost of an object; "relationships" link objects together; and "operations" model the activity of the object — what it does. These elements can be combined in a Vbase file, according to Robert P. Berkowitz, president of Ontologic.

Vbase is written in C and supports C and SQL in applications. It includes type-definition language, which serves as an object specification compiler, and extensions to ANSI C in a C language compiler that provides access to data base objects.

The product also includes development tools debugging at the model level.

The 45-employee company, based in Billerica, Mass., said it plans to provide a version for Apollo Computer, Inc. workstations in the third quarter.

Gemstone valuable to Sun

Servio Logic in Beaverton, Ore., introduced Gemstone for the Digital Equipment Corp. VAX in January and is now offering it for Sun-3 and Sun-4 workstations. It is priced between $19,950 and $85,270.

Gemstone uses a client/server approach. The data base server operates on a VAX or a Sun workstation and includes Opal, an object-oriented programming language for data definition and manipulation.

Clients may reside on either the host VAX or another VAX, the host Sun or a Sun-3 workstation, an IBM Personal Computer or a Tektronix, Inc. workstation. The company plans to add the Apple Computer, Inc. Macintosh to the list this year, said Michael Connell, general manager of data management systems.

The client software includes the Opal Programming Environment, which features windows, high-resolution bit-mapped graphics and a mouse. Applications may be written in C or Smalltalk and can run on either the workstation or the host, Connell said.

Gemstone stores data structure, behavior and value in the data base rather than in the application, making it a general-purpose system for dealing with large volumes of complex data, he said.

The Gemstone system also provides multiuser access to data with concurrency control, access through value-keyed indexes, authorization and security, clustering for efficient retrieval and recovery features, according to the vendor.

Objects are members of different classes that determine what procedures may be used for performing operations on them.

DB2 tool gets upgrade

Now application builder can order from catalog

BY CHARLES BABCOCK
CW STAFF

FORT LEE, N.J. — On-Line Software International, Inc. is slated to announce today that it has added the ability to populate the dictionary of its DB2 application building tool, Casepac, with data from the DB2 catalog.

The Population Facility added to Casepac in Release 2.0 eliminates the need to re-enter information from the DB2 catalog into the product dictionary, as earlier releases had required.

The Population Facility, which previously read IBM IMS file structures, can now also read Cobol programs and copy libraries. This feature allows Casepac to locate data items used in the application.

Compare and save

The Casepac dictionary can also compare its contents with those of the DB2 catalog, allowing it to capture any changes made to the data base from outside the dictionary. The comparison facility also lets Casepac detect discrepancies and alert those involved in the development process to possible infringements on integrity, according to Jeffrey Weinberger, Casepac product marketing manager.

Casepac also includes an Impact Analysis facility to identify all elements of an application that will be affected by a proposed change and the effort required to implement those changes across the board, Weinberger said.

The Impact Analysis component documents the results of changes to a system. "Where used" reports identify programs that have been affected by a modification. "How used" reports distinguish between inquiry and update processes, according to Weinberger.

The new release also supports key-based modeling. Primary and secondary keys are defined to aid data base design. Key-based modeling helps users ensure referential integrity of the data model, Weinberger said.

Casepac 2.0, a joint venture of On-Line Software and Tata Consultancy Services in Bombay, India, is available immediately for $200,000 under MVS/XA.

MSA

FROM PAGE 23

fined the software. First, MSA purchased two manufacturing software companies, Comserv and RTS Ltd., to fortify its manufacturing applications lineup.

Then it spun off the manufacturing business as a separate subsidiary, Advanced Manufacturing, Inc. Recently, however, the company pulled the subsidiary back into the corporate fold. While it will remain a subsidiary, it will no longer have its own separate sales or research and development effort. Company executives said this is an attempt to make the operation more efficient by cutting additional layers of management.

The acquisitions had left MSA with a collection of applications, including two competing systems for IBM mainframes, an application suite for Hewlett-Packard Co. minicomputers and applications for the IBM System/36 and 38 platforms.

In an interview at the Interact MSA users group meeting recently, Michael Hunt, president of Advanced Manufacturing, said development work is under way to merge the two mainframe offerings: Amaps-M, the original MSA software; and Amaps-Q, the Comserv product. "We recognize we can't keep up with the support of two," Hunt said.

Hunt said it will take four or five years to merge the two Amaps in a phased process of releasing software updates as common modules that will run in both the Amaps-M and Amaps-Q environments.

Meanwhile, a second development effort is under way to integrate the RTS software, which includes both manufacturing and financial applications, with the mainframe applications. This would eventually allow a user to run remote System/36 or 38 applications that tie into the mainframe manufacturing system.

Like the plans to merge the mainframe packages, this effort has a way to go before it becomes reality. Scheduled deliveries begin later this year, according to Maurice Spillane, an MSA vice-president. MSA plans to integrate the two environments in phases, adding modules to the integrated environment in the next two years, he added.

Plans for manufacturing software that runs on the HP Series 3000 platform are behind schedule. The company had announced last year that a version of this software would be available for the new HP Spectrum series by the end of 1987. MSA has not yet shipped this version, Hunt said, because HP was late in shipping MSA the Spectrum hardware.

When MSA purchased Comserv, "there was a lot of confusion. I think they ate a bigger fish than they thought they did," said Thomas Sullivan, manager of logistic systems at Miles, Inc. in Elkhart, Ind. "Now it seems pretty steady."

Ramis 4GL DBMS retains IBM focus

BY ALAN ALPER
CW STAFF

FORT LEE, N.J. — On-Line Software International, Inc. recently brought out a new release of its Ramis fourth-generation language and data base management system said to support IBM's MVS/XA operating system and offer read/write interfaces to IBM's DB2 and SQL/DS.

In its first release since acquiring Ramis 18 months ago, On-Line is seeking to improve the system's performance and provide ease-of-use features to increase its competitiveness, according to Jonathan Smith, product marketing manager.

Rather than expand the number of platforms Ramis runs on, as its primary competitor Information Builders, Inc. has done with Focus, On-Line has concentrated on the IBM mainframe environment and connectivity to Microsoft Corp. MS-DOS-based microcomputers, Smith noted.

Staunch support

"We believe a lot of users will remain on the mainframe, and we're not going to leave them," he asserted.

Users queried last week said the major improvement in Ramis Release 7.1 is that all of its functionality is now bundled in a single package, in contrast to the separate components offered in previous versions.

"There's more continuity with this release than ever before," noted Paul Tinnirello, assistant vice-president of programming at A. M. Best Co., an Oldwick, N.J., provider of insurance industry information.

There are approximately 1,300 Ramis installations, Smith said, adding that the number has increased by about 10% since the product's acquisition from Martin Marietta Data Systems. He noted that the company has sold in excess of 3,500 Ramis personal computer workstation licenses, the system's micro implementation, in its first year on the market.

High-powered answer

By supporting MVS/XA, Ramis Release 7.1 provides improved systems resource utilization, Smith said. Significant portions of Ramis applications will now run above the 16M-byte line in the MVS/XA environment, easing resource contention problems that result from Ramis use during the production cycle, he said.

Additionally, a new CICS interface is said to enable multiple copies of Ramis to run in multiple CICS address spaces as started tasks. This should relieve overhead currently imposed on CICS users, Smith noted.

The new release is also said to enable users to automatically extract or maintain DB2 or SQL/DS tables from the appropriate catalog without using SQL commands via Ramis's integrated data dictionary.

Users enter the full creator, table and column name in the interface main menu and a corresponding Ramis file description is generated. Once extracted, the user is able to access the file through Ramis's retrieval and reporting facilities. "This extends ease of use, since data from other data bases can be easily extracted without having to spend time and money on support costs," Smith emphasized.

Ramis's menu-based architecture provides access to all reporting, screen design, data maintenance, dictionary and applications development tools. A new facility, called Menu Expert, enables users to build applications without using Ramis syntax. The user is guided through the development process by a series of context-sensitive menus to generate compiled code and screen formats, Smith said.

Another feature, File Expert, is a full-screen editor for Ramis, IBM's IMS, VSAM, QSAM and ISAM file descriptions. Using File Expert, data can be assembled to and from flat, hierarchical or relational files for reports. A file description editor for Cullinet Software, Inc.'s IDMS/R, based on File Expert, is also offered with the new release.

Bozman

CONTINUED FROM PAGE 23

than six months' DB2 experience.

Concerned about DB2 sales, IBM took its own snapshot of the DB2 user base last year. The survey's results were reported to the BMC conference by Marilyn Bohl, the former DB2 product manager who resigned last August to become vice-president of development at Digital Research in Monterey, Calif.

IBM's survey of those who bought DB2 last year, Bohl said, showed that 51% still run IMS, IBM's traditional transaction-processing DBMS. About 25% had no other DBMS installed, Bohl reported, while another 12% owned a competing relational DBMS.

When DB2 Version 2.0 becomes available for shipment in October, it will contain referential integrity, auditing features and improved recovery features — all of which were lacking in DB2 Release 1.3 [CW, April 25].

In view of these changes, it would be reasonable to expect that DB2 will be pressed into increasing production use, at least in those large shops that are planning to convert to the MVS/ESA operating system and produce transaction-oriented relational applications.

A case in point is Flying Tigers, a DB2 site that has 10 production tables, each with 300,000 or more records. Steve Kwan, a DB2 data base administrator who attended the BMC conference, reported that his IBM 4381 required CPU minutes — instead of CPU seconds — to generate certain inventory reports. As slow as that seems, Kwan says, DB2 still saved Flying Tigers time.

What does the future hold for DB2 users? Well, IBM has done quite enough arranging for now, BMC's Olson believes. He says he expects some enhancements in 1989 — but nothing on the order of what happened two weeks ago.

Looking behind and ahead

Behind the scenes, IBM is said to be working on adding distributed data base technology to the DB2 product line. To do this, IBM will be applying artificial-intelligence features to help PC users ask remote DB2 data bases for answers to their queries.

And that's not all. "IBM's intent is to provide a high-level programming product using LU 6.2 and APPC as a call interface to [remote] applications," says Bohl, who worked at IBM for 19 years.

Now that IBM is listening closely to users, ease of use will be the goal of future DB2 systems, Bohl says. And yet a lot of work remains to be done. "It's a great world when anybody can update a data base from anywhere," Bohl says. "But it will be some years from now before that happens." Users may infer that, like a time-release capsule, DB2 features will be delivered in measured doses.

Bozman is *Computerworld*'s Chicago-based Midwest correspondent.

BMC SOFTWARE

In the U.S., 1-800-841-2031
In Canada, 1-800-231-2698
In Texas and Alaska
call collect, 713-240-8800

BMC Software, Inc. CW
P.O. Box 2002 • Sugar Land, TX 77487-2002

☐ I am interested in a 30-Day-Plus Free Trial of DELTA/IMS VIRTUAL TERMINAL

☐ Please contact me with more information on DELTA IMS VIRTUAL TERMINAL

Name _____

Title _____

Company _____

Address _____

City _____ State/Prov. _____ Zip/PC _____

Telephone _____

Virtual Storage Constraint Relief is just around the corner when you install DELTA IMS VIRTUAL TERMINAL and significantly reduce your virtual storage demands.

IMS/VS requires a control block in the IMS/VS control region for every IMSGEN-defined terminal in your network. With DELTA IMS VIRTUAL TERMINAL, the only 3270 and SLU2-type terminal control blocks present in storage are for those terminals logged on to IMS/VS.

Now you can stop basing your virtual storage needs on your maximum network size. DELTA IMS VIRTUAL TERMINAL lets you plan your storage needs on the maximum concurrent demand.

- No longer will control blocks for idle 3270 and SLU2-type terminals tie up virtual storage.
- No longer will control blocks for infrequent users tie up virtual storage.
- No longer will control blocks for planned, but not yet assigned, terminals tie up virtual storage.

For more information on DELTA IMS VIRTUAL TERMINAL, or to begin a 30-Day-Plus Free Trial, clip and mail the coupon. Or Call BMC Software.

Expert system

CONTINUED FROM PAGE 23

troubleshooters by saving them hours of poring over MVS performance data, according to Bruce Ketchledge, a developer of the product at ADR.

Mindover MVS scans the mainframe with the same procedures used by ADR's Look MVS operating system performance monitor. Look MVS is not a prerequisite for Mindover MVS, however.

A communications link tied to the monitor transmits information to the expert system on a PC. The PC must be an IBM Personal Computer AT or Personal System/2 Model 50, 60, 70 or 80 running IBM PC-DOS 3.0 or higher with a 2M-byte hard disk.

Minding metrics

Mindover MVS measures about 400 metrics — such as the number of jobs in a wait state or system-task paging as a percentage of the total paging rate — across 12 areas of MVS performance, including CPU throughput, I/Os, paging and swapping.

By operating 24 hours a day, it can spot problems in system use and make recommendations on what to do about them while they are still small, according to Michael Anthony, director of systems product marketing.

Data collected from the operating system is fed into an analysis module on the PC, where exceptions or problems trigger a forward- or backward-chaining reasoning process through the rules of the system's knowledge base. The rules represent the combined expertise of ADR's performance analysts, Ketchledge said.

Users may recreate the reasoning chains behind Mindover MVS recommendations, providing an explanatory process to a junior system programmer learning MVS tuning, Anthony said. References to appropriate IBM documentation are also provided, he said.

As an example of the product's use, Anthony described a system operator using it to troubleshoot poor response time. Mindover MVS responds that excessive paging is slowing the system down and recommends that operators consider isolating the frequently accessed data set in storage to reduce paging. It would take the product 20 to 40 minutes to analyze such a situation and make recommendations, Anthony said.

The vendor has been shipping the first release of Mindover MVS at a price of $42,500 since March 31, with 16 licenses so far.

NEW PRODUCTS

Systems software

A cross-reference and documentation software package for IBM MVS-based systems has been announced by **Computer Concepts, Inc.**

Called **QXR-19**, the software is said to allow users to build a data base of cross-reference information to manage MVS libraries. According to the vendor, it can access and research libraries containing source code, object modules, procedures, IBM JCL, load modules and user-defined records. The data is output to a data base that can be accessed either on-line or by batch processing.

QXR-19 can be run interactively under IBM's TSO, ISPF or Roscoe. It licenses for $295 per month for a one-year lease and $8,850 for a 99-year lease.

Computer Concepts, Suite 150, 9900 S.W. Greenburg Road, Tigard, Ore. 97223. 503-639-1450.

Applications packages

An enhanced version of **Dataviews**, a line of graphics software products for displaying data in real-time graphics, has been announced by **V. I. Corp.**

Dataviews 6.0 allows users to design their own interface and control application programs, the vendor said. Other features include enhanced cut-and-paste capabilities and 39 graphics options.

Dataviews includes DV-Tools, a subroutine library that incorporates input and graphics output capabilities, and DV-Draw, a drawing editor.

Dataviews runs on engineering workstations under Unix or IBM's MVS. Prices start at $7,700 for DV-Draw and $17,700 for DV-Tools and DV-Draw. Run-time licenses start at $3,000.

V. I. Corp., Amherst Research Park, Amherst, Mass. 01002. 413-253-3482.

A business planning and control and financial modeling software package for Digital Equipment Corp. VAX systems has been announced by **Holistic Systems, Inc.**

Holos features a personal computer-like user interface, multidimensional modeling and links to SQL-based data bases, according to the vendor. It provides both tabular and graphical reports, which can be used for input and modification of information as well as for output, the vendor said.

Holos is priced from $40,000.

Holistic Systems, Suite 2500, 7400 E. Orchard Road, Englewood, Colo. 80111. 303-721-0276.

Utilities

Davis, Thomas & Associates, Inc. recently released Version 3.0 of its remote print software, **DTA/Print.**

DTA/Print 3.0 was designed for IBM VM Spool queues as well as for IBM DOS/VSE Power queues. The software is a report distribution and viewing system that reportedly allows any report in any Power or VM Spool queue to be routed to any attached CICS printer or CRT. Security features allow any Power or VM Spool file protection as well as system and printer control.

DTA/Print 3.0 costs $5,000 for access to Power queues and $7,000 for access to both Power and VM Spool queues.

Davis, Thomas & Associates, 550 Waterford Park, 505 N. Country Road 18, Minneapolis, Minn. 55441. 612-591-6100.

A utility for validating IBM JCL syntax and standards has been announced by **Consumer Systems Corp.**

Called **JCL Audit**, the software is said to allow users to determine if their OS/MVS JCL is free of errors before the production run. It also reduces job reruns due to JCL errors, the vendor said, and helps ensure compliance with corporate JCL naming conventions.

JCL Audit costs $8,250.

Consumer Systems, 2 E. 22nd St., Lombard, Ill. 60148. 312-495-8822.

Development tools

Softech, Inc. has announced an improved pricing structure for its **Ada-86** Ada cross-development system for the Intel Corp. line of microprocessors.

One object code license for the full line of Intel microprocessor cross-development systems hosted on a Digital Equipment Corp. Microvax 2000 is now priced at $4,000. Licenses for more powerful DEC processors are priced as follows: Microvax II, $8,000; Microvax 3500, $9,000; VAX 8250, $10,000; VAX 8600 series, $18,000; VAX 8700, $21,000; and VAX 8800, $25,000.

Softech, 460 Totten Pond Road, Waltham, Mass. 02254. 617-890-6900.

Sybase, Inc. has ported its **Sybase Datatoolset** line of application tools to Sun Microsystems, Inc.'s Sun386I workstation.

The Datatoolset is a component of the Sybase system, an SQL-based relational data base management system for on-line applications.

A development version of the Sybase Datatoolset for the Sun386I workstation costs from $3,000 to $4,000. The run-time software system, when purchased with the development system, is priced at $1,000.

Sybase, 2910 Seventh St., Berkeley, Calif. 94710. 415-548-4500.

Tired of frequent stops for IMSGENs? Install DELTA IMS VIRTUAL TERMINAL on your IMS/VS system and begin eliminating IMSGENs immediately.

IMS/VS requires a control block for every terminal in your network. Every time you add or delete a terminal, you must do an IMSGEN. You are faced with lengthy IMSGENs, or frequent IMSGENs, or delays in adding new users until the next scheduled IMSGEN.

With DELTA IMS VIRTUAL TERMINAL, you need only one control block defined in an IMSGEN for each *type* of terminal in your network.

- Terminal-related IMSGENs for 3270 and SLU2-type terminals are almost totally eliminated.
- New users can be added in minutes, on demand.
- Productivity for system programmers improves.

For more information on DELTA IMS VIRTUAL TERMINAL, or to begin a 30-Day-Plus Free Trial, clip and mail the coupon. Or call BMC Software.

In the U.S., 1-800-841-2031
In Canada, 1-800-231-2698
In Texas and Alaska
call collect, 713-240-8800

BMC SOFTWARE

BMC Software, Inc. CW
P.O. Box 2002 • Sugar Land, TX 77487-2002

☐ I am interested in a 30-Day-Plus Free Trial of DELTA/IMS VIRTUAL TERMINAL

☐ Please contact me with more information on DELTA IMS VIRTUAL TERMINAL

Name _____

Title _____

Company _____

Address _____

City _____ State/Prov. _____ Zip/PC _____

Telephone _____

WE AIN'T #1 BY ACCIDENT.

FOCUS is the number one fourth-generation language on mainframes, minis, and micros.

Why? Because it actually does what a 4GL is supposed to do. And 400,000 users agree.

If you're skeptical, make us prove it.

Just give us a call and we'll come to your place, install FOCUS, and create a prototype application that (and here's the trick) runs against your production database.

Or, if you prefer, against FOCUS' own shared-relational database manager. Either way, we'll do it in four hours. At no charge.

What's more, we'll write the entire application in the FOCUS language—with no exits to COBOL, FORTRAN, or C for the hard parts. FOCUS is such a complete language you can use it to write almost any application—from heavy-duty transaction systems to any type of online inquiry system.

Moreover, FOCUS can directly access every major database system running on every major hardware platform.

We're talking about online access here, not merely batch data extracts. And FOCUS will address multiple databases simultaneously, and perform outer joins.

We'll take that a step further. If two computers communicate, a FOCUS user on one can, via FOCUS on the second machine, access any major database running there.

FOCUS supports IBM 370, PC and PS/2, VAX/VMS, UNIX V, Wang VS, and others. With, we might add, full portability. An application developed in any of these environments will immediately execute in any other.

That means, for example, that you can use a PC as a workbench for mainframe application development.

SQL compatibility? However you need it, FOCUS can do it.

There's more.

Developers' Windows let your professional programmers use a windowed interface to create window-driven applications quickly and easily. The result is great-looking software with a superior user interface.

TableTalk is the FOCUS point-and-pick windowed interface that lets your end users create their own inquiries, customized reports, or even relatively complex applications—using only the arrow keys and the enter key.

And FOCUS lets you set the security and access levels you want.

Who says we're number one?

"Information Builders' 4GL products were, once again, the only ones to lead in their niche in mainframes, minis, and micros. No other vendor has duplicated this feat in the seven-year history of this research effort."

—Software Magazine 1988 Software Market Survey

Sound too good to be true? It's not. But don't believe this ad. Make us prove it.

Just call 1-212-736-4433, Ext. 3700, and ask for details. And if you give the word, one of our technicians will come out to your place and make it happen.

Right before your eyes.

FOCUS
Information Builders, Inc.

MICRO BITS

Ed Scannell

Microsoft snubs Unix?

A vested interest? Microsoft may be soft-pedaling its commitment to the Unix market in the face of recently lost momentum. Late last month the company put out a backgrounder discussing and explaining binary standards (defined as a group of applications compatible with a hardware base), and questioned whether Unix would ever become such a standard.

This is a curious development, considering that Microsoft was once a major advocate of Unix and has long promoted the fact that Xenix outsold all other derivatives of Unix. Adding to the irony is that Microsoft signed a deal with AT&T to develop a Unix version for the 80386.

However, in the highly political Unix wars, Microsoft may have come out on the losing end with the recent Unix announcements from AT&T and Sun Microsystems — Microsoft didn't even attend the AT&T/Sun press conference. And Microsoft has been hesitant to discuss the Presentation Manager-style interface it hinted about delivering for Unix.

Continued on page 34

Lotus spices up corporate CD

BY DOUGLAS BARNEY
CW STAFF

CAMBRIDGE, Mass. — Lotus Development Corp., which continues to plug away at the nascent market for CD-ROM data, today announced the second release of CD/Corporate, a product that delivers data on 12,000 public U.S. corporations.

Primary users have been in banking, investment, consulting, accounting and schools of management, Lotus officials said.

The system, acquired last year from Datext, Inc., consists of a compact disk/read-only memory (CD-ROM) player and a set of CD-ROM data disks containing the information. Users query the system in a variety of ways via menus and can print the results. According to David Roux, vice-president of Information Services Group at Lotus, the system is intended to provide pertinent information in a useful form.

Although highly beneficial for particular organizations, CD/Corporate is not inexpensive. Users get the player and 600M bytes of compressed data at prices ranging from $13,000 to $18,500.

Access improved

The latest release boasts a host of new features, primarily aimed at providing users with more sophisticated data base querying and screening capabilities. Now, users can employ the menus to screen and access information based on some 150 descriptive and financial variables.

CD/Corporate consists of seven different data bases: Disclosure II, Investext, Promt, ABI/Inform, Who's Who in Finance and Industry, Media General and Market Guide.

From these data bases, users can get financial statements, 10K excerpts, investment analysis reports, trade-press abstracts, executive biographies and stock prices and trading data.

The system even includes esoteric bits of information, such as Digital Equipment Corp. President Ken Olsen's resume.

The system also features access to Dow Jones News/Retrieval and CD/Newsline.

CD/Corporate is considered to be part of Lotus's One Source product line, which includes a variety of numeric and reference data bases, all accessed via CD-ROM.

One Source includes data bases on international companies, commercial banks and sav-

Continued on page 35

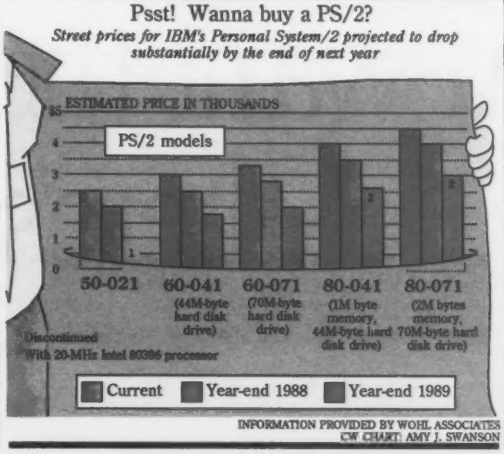
Inside

- Page preview latest feature in Samna word processing software. Page 35.
- Ovonic announces electronic filing and imaging system for IBM PC XT, AT and compatible users. Page 37.

Data View

Psst! Wanna buy a PS/2?

Street prices for IBM's Personal System/2 projected to drop substantially by the end of next year



INFORMATION PROVIDED BY WOHL ASSOCIATES
CW CHART: AMY J. SWANSON

Firm pushes laptop package over piecemeal purchases

BY DOUGLAS BARNEY
CW STAFF

EVERETT, Mass. — Laptop computers are frequently bought like furniture: The customer often picks out one main piece and then loads up on accessories until the room is filled. The machine itself may be bought; then things like modems and printers are laboriously added.

A firm called Microdirect, Inc. says this is the wrong way to buy a laptop. Instead of piece-by-piece purchasing, the firm is offering an entire system: the laptop, an inkjet printer and an optional battery-powered portable

Continued on page 35

Microdirect's *laptop system*

Excelerator Micro Focus COBOL/2 Workbench ... from design to tested code

Analyze, design, develop, compile and test mainframe or microcomputer COBOL applications in an integrated workstation environment with our Excelerator Interface.

The Interface converts system designs from Index Technology's Excelerator systems analysis and design software into structured skeletal COBOL source code that can be refined using the Micro Focus® COBOL/2 Workbench™ programming environment. Previously, integrated support for all stages of COBOL application development required the use of mainframe systems.

Outstanding benefits and features:

- Conversion of structure charts into skeleton COBOL programs which can be used within COBOL/2 Workbench
- Translation of Excelerator data records, elements, screens and reports into COBOL data descriptions, screen maps and report layouts by Micro Focus screen and report formatters
- Creation of usable PC and mainframe COBOL code, plus BMS and MFS assembler macros
- Increased productivity by automating the tedious work of coding screen, report and record layouts
- Reduced mainframe utilization by using PC workstations across the systems development life cycle
- Reduced coding errors by enhancing communication between users, analysts and programmers
- Can be invoked from the Micro Focus COBOL/2 Workbench or DOS command line

Compile and Run Huge CICS and IMS Programs:

After you create programs, test them with the CICS or IMS Option for COBOL/2 Workbench and put a mainframe on your desktop! Take advantage of the extended memory option on your PC/AT or PS/2 to test programs with Data and Procedure Divisions of up to 16 MB with XM.

COBOL/2 Workbench is a unique system of software tools for maintaining, creating, testing and running advanced COBOL programs on PCs. The Excelerator Interface option greatly enhances its usability for mainframe programmers.

For the most efficient development of either your PC or mainframe programs, call us now.

1-800-872-6265

U S: 2465 E. Bayshore Road
Palo Alto, CA 94303
(415) 856-4161

U K: 26 West Street
Newbury, Berkshire RG13 1JT
(0635) 32646

MICRO FOCUS®
A Better Way of Programming™

Excelerator is a registered trademark of Index Technology Corporation.

If you want the best there's only

Whether you want the best portable or desktop, the best 80286- or 80386-based personal computer, there is only one choice: Compaq. Because COMPAQ personal computers are consistently rated the best in each class by both industry experts and sophisticated users.

For instance, the COMPAQ DESKPRO 386/20 and the COMPAQ PORTABLE 386 are the most powerful personal computers in the world. Both are based on the 32-bit Intel® 80386 microprocessor, running at a blazing 20 MHz. Both offer the most storage and memory in their classes. And both feature performance enhancements such as concurrent bus architecture, disk caching, and high-speed coprocessor options. All of these features work together to deliver system performance that rivals minicomputers'.

The groundwork for these innovations was laid by the industry's first 80386-based personal computer, the 16-MHz COMPAQ DESKPRO 386. Still outperforming most 80386 machines, it offers high-performance capabilities to users moving up to this class.

In the arena of 80286-based personal computers, the 12-MHz COMPAQ DESKPRO 286 runs your software up to 20% faster than most of its 10-MHz competitors.

No one even comes close to Compaq in portable computing. Because no one but Compaq builds portables with all the features sophisticated users need. The 20-lb. COMPAQ PORTABLE III is the smallest full-function 80286-based computer that truly gives you the power of a desktop. And the COMPAQ PORTABLE II still offers more internal expansion capabilities than any other portable.

*Based on an independent survey of major brands. †Based on an independent survey of 209 FORTUNE 1000 companies.

personal computer, one choice.

Computer users at every level will find that COMPAQ computers represent the best solutions. We've consistently expanded the limits of personal computer technology with advanced features that optimize overall system performance. All while preserving your investment in industry-standard hardware and the world's largest library of business software. Compaq also works to engineer each computer to meet exacting quality and reliability standards, so it's ready to withstand the rigors of the real world.

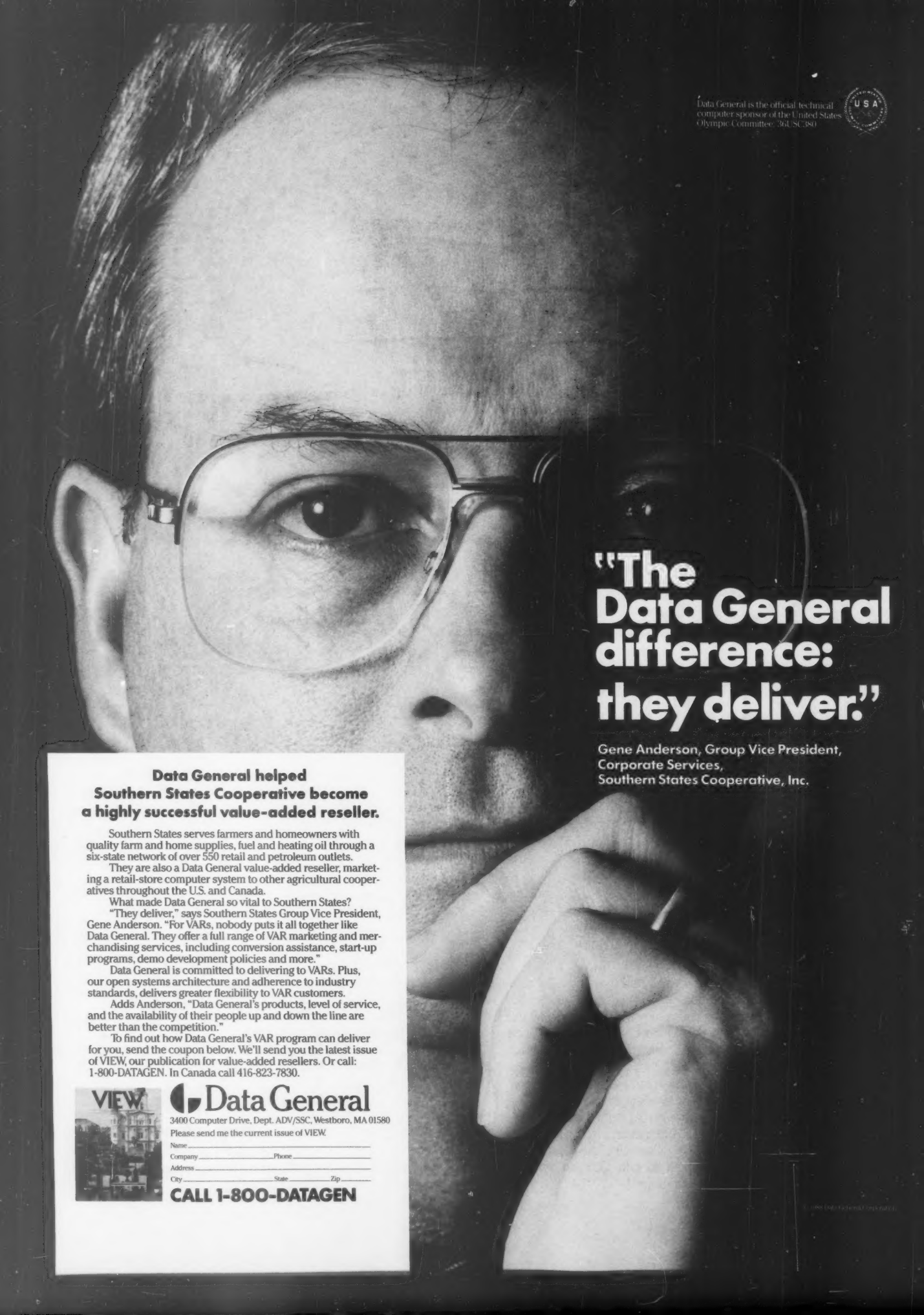
These are all reasons why Compaq earns the highest quality ratings from computer experts. And unsurpassed satisfaction ratings from computer users.* It's also why, this year, more FORTUNE 1000 corporations plan to add Compaq to their approved vendor lists than any other brand.†

If you want the best personal computer, you have only one choice. Call 1-800-231-0900, Operator 50. Or, in Canada, call 1-800-263-5868, Operator 50. We'll give you a free brochure or the location of the Authorized COMPAQ Computer Dealer nearest you.

COMPAQ® COMPAQ PORTABLE II® COMPAQ DESKPRO 286® and COMPAQ DESKPRO 386® are registered trademarks of Compaq Computer Corporation. ®Registered U.S. Patent and Trademark Office. COMPAQ PORTABLE III™ COMPAQ DESKPRO 386/20™ and COMPAQ PORTABLE 386™ are trademarks of Compaq Computer Corporation. Intel is a registered trademark of Intel Corporation. ©1988 Compaq Computer Corporation. All rights reserved.

COMPAQ

It simply works better.



Data General is the official technical computer sponsor of the United States Olympic Committee: 36USC380

"The Data General difference: they deliver."

Gene Anderson, Group Vice President, Corporate Services, Southern States Cooperative, Inc.

Data General helped Southern States Cooperative become a highly successful value-added reseller.

Southern States serves farmers and homeowners with quality farm and home supplies, fuel and heating oil through a six-state network of over 550 retail and petroleum outlets.

They are also a Data General value-added reseller, marketing a retail-store computer system to other agricultural cooperatives throughout the U.S. and Canada.

What made Data General so vital to Southern States?

"They deliver," says Southern States Group Vice President, Gene Anderson. "For VARs, nobody puts it all together like Data General. They offer a full range of VAR marketing and merchandising services, including conversion assistance, start-up programs, demo development policies and more."

Data General is committed to delivering to VARs. Plus, our open systems architecture and adherence to industry standards, delivers greater flexibility to VAR customers.

Adds Anderson, "Data General's products, level of service, and the availability of their people up and down the line are better than the competition."

To find out how Data General's VAR program can deliver for you, send the coupon below. We'll send you the latest issue of VIEW, our publication for value-added resellers. Or call: 1-800-DATAGEN. In Canada call 416-823-7830.

Data General

3400 Computer Drive, Dept. ADV/SSC, Westboro, MA 01580

Please send me the current issue of VIEW.

Name _____

Company _____ Phone _____

Address _____

City _____ State _____ Zip _____

CALL 1-800-DATAGEN

SMALL TALK

Jeffrey Tarter

Apple cramps buyers' style

Thanks to Apple's look-and-feel lawsuit against Microsoft and Hewlett-Packard, corporate buyers these days seem to be full of doom and gloom. "Just when we were about to achieve an industry standard graphical interface," they complain, "Apple kicks us back to the bad old days of the A Prompt. . . . Now we've lost our best chance to make computers easy to use."

Well, maybe. But I suspect that much of the knee-jerk reaction to the Apple suit reflects profound misconceptions about the Macintosh interface concepts that Apple successfully popularized. Especially among traditional personal computer users, there is a growing respect for the value of graphical interfaces and for the standardization that Apple managed to impose on Macintosh-based software.

However, there's also a widespread belief that graphical interfaces work like pixie dust — sprinkle a handful of icons over a PC, and it suddenly becomes intuitively easy to use.

Much of what PC users believe about Macintosh-like interfaces is a collection of myths:

Myth I: The Macintosh's interface makes all applications look alike.

For the last four years, Apple has gone to a good deal of trouble to persuade Macintosh developers to follow detailed interface design guidelines. These guidelines define visual elements, including menu styles, dialogue boxes and icons.

The result of this is a framework of consistency that helps novice users learn the rudiments of an application much

Continued on page 35

Clone maker's prosperity tied to success of its PS/2-compatible chip sets

To clone or not to clone has never been a question for Chips and Technologies, Inc., which was formed to create chip sets for vendors seeking to replicate the IBM Personal Computer AT. The firm achieved swift success — net income rose from $1.9 million in fiscal 1986 to $24.7 million in fiscal 1987 — and was instrumental in creating competition in the clone market that ultimately drove prices down and pushed quality up.

IN PERSON

Recently, Dell Computer Corp., a Chips and Technologies customer, became the first systems vendor to formally announce an IBM Personal System/2 Micro Channel compatible, followed closely by Tandy Corp.'s PS/2 Model 80-compatible using Intel Corp.'s chip set.

These machines have demonstrated how the future of Chips and Technologies is tied to the success of its PS/2-compatible chip sets.

Chips and Technologies' *Campbell*

But, is corporate America going to buy Micro Channel machines from compatible vendors when it is not even certain that it will convert to Micro Channel machines from IBM?

Even Gordon A. Campbell, president and chief executive officer of Chips and Technologies, said he would have trouble justifying a Micro Channel machine for some members of his staff.

West Coast correspondent James A. Martin and Senior Editor Ed Scannell questioned Campbell recently on key issues surrounding IBM's Micro Channel bus.

Besides Dell, how many OEM vendors have you signed up so far?

Originally, we visited 55 vendors, and at least 30 to 35 of them have been actively pursuing Micro Channel projects.

Most of those, I assume, will turn into Micro Channel machines at some point.

How long after a firm receives the chip sets will a machine be ready for market?

It varies. We've had people who would show a product and make an announcement literally within two weeks of first getting the chip sets. But it's much more typical for them to take two to three months.

Will we see a rash of Micro Channel machines by mid-year?

I think you'll see a number of different Micro Channel-compatible products, as well as systems being shown at Comdex/Spring '88.

I think this year, the show will have a little more significance than normal because of the PS/2 compatibles that will appear for the first time.

Concerning IBM's threat to sue over the Micro Channel, how much of that has

Continued on page 36

Macintosh tool fails to dig niche in market

BY JULIE PITTA
CW STAFF

CUPERTINO, Calif. — Apple Computer, Inc.'s personal tool kit for the Macintosh, Hypercard, has proven to be something of a disappointment. Despite a celebrated launch last August, Hypercard has failed to capture the imaginations of corporate users and large third-party software developers.

"Apple had very lofty goals for it [Hypercard], and they haven't been met yet," said Bill Higgs, an industry analyst for Infocorp, Inc. "They had hoped to create a whole new class of software based on Hypercard, but the major software developers and publishers haven't used it."

Touted as a tool that would allow the average user to create personalized applications, Hypercard appears to have gained only lukewarm acceptance among corporate users. Like a new toy, Hypercard received a lot of attention at the beginning, but it was then set aside like so many other gadgets.

Hypercard

Price: $49 stand-alone, but currently bundled with every new Mac

Requires:
- Mac Plus, SE or II
- 20M bytes of RAM for use with other applications under Multifinder
- Two 800K-byte flexible disk drives or one hard disk drive and an 800K-byte flexible disk drive
- Two expansion slots

"It's dangerous to assume that users will take advantage of a feature just because it is available to them," Higgs maintained, noting that few users will spend the time necessary to develop Hypercard applications. "The way Hypercard is receiving more widespread use is by diligent users passing along Hypercard 'stacks' they have written to co-workers," he added.

Michael Cromar, director of information resources for American President Companies Ltd. (APC), a shipping firm based in Oakland, Calif., said Hypercard has yet to be "institutionalized" at his company.

"It hasn't taken off," Cromar admitted. "It needs to be multiuser and be able to work in a multitasking environment to really take off so that information can be shared with other users."

For his own use, Cromar has built personalized data bases

Continued on page 34

Defense network mimics human brain

BY ALAN J. RYAN
CW STAFF

SAN DIEGO — Centuries ago, brain power and human logic helped advance combat weapons from hands and rocks to guns and cannons. But in the near future, sophisticated defense systems may incorporate computers that actually mimic the human brain.

To achieve this goal, the Army's Laboratory Command, Electronics Technology and Devices Laboratory has recently awarded a multiphased contract to Hecht-Nielsen Neurocomputer Corp. (HNC), to identify 10 Army battlefield areas that could be improved using neural networks.

'Learning by example'

Neural networks provide a computer with the ability to learn by example. The most significant difference between neural networks and traditional computers, including artificial intelligence systems, is their self-organizing ability.

This is a technology that could prove critical in defense applications in which human error could cost lives.

The systems, which are based on models of how the human brain encodes and processes information, have not been previously used in defense systems, according to Robert North, president and chief executive officer of HNC.

North said the HNC neural network architecture provides many of the capabilities needed to solve critical defense problems. According to North, even simple neural networks exhibit complex behaviors such as learning, pattern recognition and associative memory.

These capabilities, difficult or

Continued on page 35

Top sellers

Software: April 25-29

1	Lotus's 1-2-3
2	Ashton-Tate's Multimate Advantage II
3	Fifth Generation Systems' Fastback
4	Software Publishing's Professional Write
5	IBM's Displaywrite 4
6	Delta Technology's Direct Access
7	Ashton-Tate's Dbase III Plus
8	IBM's PC-DOS 3.3
9	IBM's Fixed Disk Organizer
10	Wordperfect Corp.'s Wordperfect

INFORMATION PROVIDED BY CORPORATE SOFTWARE, INC.
CW CHART

Scannell

CONTINUED FROM PAGE 29

Microsoft can't wriggle out of its commitment to Unix altogether, but we think people will be watching a little more carefully what Microsoft does in that market.

Such a deal. If I were one of the folks over at Ashton-Tate, I'd be feeling a little like someone who just bought swampland in Florida.

In an editorial in its monthly newsletter, Wordtech said its experience in working with Dbase IV SQL technology led the company to reject it. Wordtech, if you remember, sold its SQL technology to Ashton-Tate last year.

Under Wordtech's development approach, an SQL query is translated into the equivalent Dbase query, which is then executed by the Dbase engine.

Wordtech said this process is slow and memory-intensive, but the most limiting factor is that it doesn't allow Dbase to talk with larger systems. Dbase IV's "one-way" communication capability only lets mainframes query micros, according to the editorial.

According to Wordtech, a better approach to SQL is to bring together a Dbase front end with an SQL engine. This approach allows greater interoperating system communications and improved performance.

But Ashton-Tate plans to do exactly this, based on its SQL Server agreement with Microsoft, so the Wordtech criticisms apply only to Dbase IV as a standalone system.

Wordtech said it is committed to this same approach in developing SQL support for its products.

It won't be long now. At a recent press conference, Phillip White, Wyse Technology's president, said that the patents on IBM's Micro Channel architecture could be available in Europe as early as September.

White said he doesn't expect them to be available in this country, however, until next April. While Wyse is interested in Micro Channel technology, White said his company probably wouldn't deliver a clone until all the legal ambiguities were clarified.

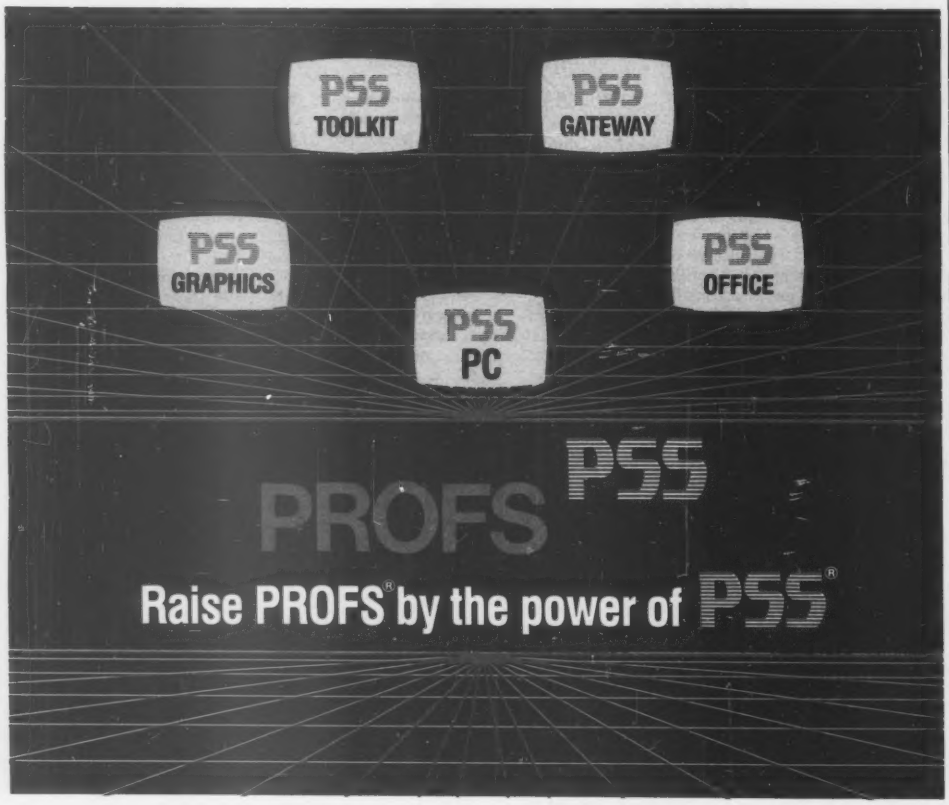
Commenting on the recent Micro Channel architecture clones introduced by Tandy and Dell, White made an interesting point about why the two, in part, were early to announce. Because both companies have control of their own distribution channels, they don't need to indemnify third-party dealers, which could prove costly if IBM eventually decides to bring suit.

While this isn't the main reason Compaq and other vendors that rely on dealers are hesitant to deliver Micro Channel architecture clones, it is another thing to think about.

Aside from the usual talk of Micro Channel, White said he expects the demand for Presentation Manager to be slow because of the ongoing shortage of memory chips and their prices (which are expected to continue to rise).

He added that he doesn't think companies with large numbers of 512K- and 640K-byte IBM Personal Computers will want to dish out major bucks to get the necessary 3M to 4M bytes to run both Presentation Manager and the versions of OS/2.

Scannell is a *Computerworld* senior editor, microcomputing.



PSS powers your IBM VM/PROFS installation to a new level of performance. PSS is an advanced, fully proven, integrated software system that fulfills your business information needs. It is a cost-effective alternative to in-house software development while providing the tools to meet your unique requirements.

If you would like to know how to raise the performance of your PROFS by the power of PSS, return this coupon to IIS Technologies or call us toll-free at 1-800-263-9673

NAME _____

COMPANY _____

ADDRESS _____

PROV. STATE _____ POSTAL CODE ZIP CODE _____

TELEPHONE _____

IIS Technologies
A Bell Canada Company

275 Matheson Blvd., East
Mississauga, Ontario L4Z 1X8
1-800-263-9673

IIS Technologies
A Bell Canada Company

275 Matheson Blvd., East
Mississauga, Ontario L4Z 1X8
1-800-263-9673

*PSS is a registered Canadian trademark of Bell Canada.
®PROFS is a registered trademark of International Business Machines Corporation.

IBM

Macintosh

CONTINUED FROM PAGE 33

such as phone lists and calendars through the use of Hypercard. "I entered my Rolodex," he explained, "by using it. I can remember someone's first name and his company, and with a key word, I can find his full name, title and phone number from a list of 2,000 in a matter of minutes. On an individual basis, it is very handy."

Currently, Cromar is building a specialized data base using Hypercard to list all the publications and documents produced in his department. He hopes to share that data base with other Macintosh users at APC.

Third-party support sought

Steven Morelli, a general manager of financial planning and control at H. J. Heinz Co., said he would like to see major third-party Macintosh software developers support Hypercard so that it could be linked to widely used data base, word processing and spreadsheet packages.

"I would like to have access to [Microsoft Corp.'s] Excel from Hypercard," he said. "If there were linkages to packages like Excel, it could become a real executive tool."

Hypercard has been used to build a part-graphics part-text data base detailing certain processes within Heinz, such as the creation of certain food products.

Jim Hayes, vice-president of Seafirst Corp., a Bankamerica Corp. subsidiary, and general manager of its electronics services division, said Hypercard has received only limited use within Seafirst because of memory constraints.

Most of Seafirst's Macintoshes have either 512K bytes or 1M byte of random-access memory, Hayes said. For optimal use, Hypercard requires at least 2M bytes of RAM.

Hayes said a memory upgrade for Hypercard would not be justified because of the cost. "I don't detect a lot of general enthusiasm for it," he said.

Product protects files from MS-DOS wipeout

BY ED SCANNELL
CW STAFF

MANCHESTER, N.H. — Softlogic Solutions, Inc. has announced a data protection program that ensures the recovery of erased information.

The Data Guardian does not let random chance decide whether file recovery is possible. It blocks Microsoft Corp.'s MS-DOS from writing over an area where a deleted file is located.

The program is actually a series of interrelated programs that guarantee file recovery by taking advantage of the way MS-DOS works.

When MS-DOS deletes a file, a Softlogic spokesman explained, the file name is removed from the directory. The physical data, however, is left on the disk until the space occupied by that file is reused. So the more someone uses a disk following the erasure of a file, the less recoverable a complete file becomes.

Resurrect method chancy

Other file recovery systems recover files by resurrecting the physical data before DOS reallocates the data space and before the directory is reused. Users can recover a complete file only if the space has not been altered and the directory entry is still unused.

When a file is deleted, Data Guardian automatically stores the date, time and file name in a separate directory and saves the data space where the file is located for a period of time specified by the user, which can be up to 99 days.

A visual display and pattern of musical tones lets users know if the Data Guardian system is active or not when a file is deleted.

Programs unique to the Data Guardian include an optional track saver function that protects the hard disk surface by repositioning the drive head every 14 seconds when the drive is inactive.

Softlogic will incorporate Data Guardian into its Disk Optimizer 4.0 product, which will be priced at $69.95. Users of earlier versions of Disk Optimizer can upgrade for $22.50 direct from the company. The product is available immediately.

Samna's page view shows up

ATLANTA — Microsoft Corp. added it to its popular word processor. Now Samna Corp. has followed suit by adding a page preview feature to its high-end word processing software.

According to the company, its latest releases, called Samna Word IV and Samna Plus IV, now allow users to view a document as it will appear when printed.

The feature is useful as documents become increasingly complex, taking on many of the elements pioneered by many desktop publishing packages.

Users can see how fonts, graphs, text and scanned images will look on the page, which can be fine-tuned prior to printing. This saves the time spent printing awkward-looking documents that must be reworked, and saves on paper and toner cartridges as well. The packages provide three levels of magnification, allowing users to hone in on a particular image.

The packages also include a thesaurus based on *The Proximity/Merriam-Webster Thesaurus*, a table of authorities generator and added support for scanned documents and images.

Samna word processing software has been particularly successful in high-end markets such as legal document processing.

Samna Word IV is priced at $595, and Samna Plus IV sells for $695. UNIX versions range from $745 to $11,900, depending on the particular system and hardware configuration.

Defense

FROM PAGE 33

impossible to achieve with conventional computers, can help deliver advanced defense systems for applications such as radar, sonar and image processing, data fusion and data compression, opposing force modeling (war games) and weapons aiming and steering, according to North.

The three areas where the neural network technology will likely impact defense computing are knowledge processing, sensor processing and control, North said.

In knowledge processing, the neural network is able to tolerate contradictory and imprecise data and can process large amounts of information quickly.

"Neural networks can make sense of incomplete or imperfect data, such as an imperfect photograph or an imperfect drawing," explained Jacqueline Townsend, a spokeswoman at HNC.

Sensor processing is aimed at tuning modern sensor systems that already require exceedingly complex algorithms for interpretation.

The neural networks develop their own algorithms based on experience, which may help overcome the complexity barrier while delivering defense systems capable of human-like discrimination.

According to Townsend, "Neural networks, being trained by example, cut down on the software development time."

In control applications, the neural network's self-programming capabilities could lead to robots that can learn to perform tasks by "watching" humans perform them or by feedback from a trial and error approach.

Robots could be used to perform dangerous or repetitive tasks.

Tarter

FROM PAGE 33

more quickly than they do with Microsoft MS-DOS applications.

But, as soon as you move beyond the basics and deal with advanced applications features, all bets are off. A user who expects to migrate easily from Ashton-Tate's Dbase Mac to Acius' Fourth Dimension or Nashoba Systems' Filemaker Plus — or from Microsoft's Microsoft Word to Wordperfect Corp.'s Wordperfect — learns that each application has special quirks that require a serious time investment in learning.

In fact, Macintosh software is occasionally harder to learn than comparable PC applications, because the bit-mapped display allows developers to create screens that are almost as complicated as airplane cockpits.

Myth II: Macintosh-like interfaces will eliminate most of the confusion that MS-DOS users now face.

Graphics environments, such as Microsoft's Windows and the Presentation Manager, may provide a superficial imitation of the Mac interface, but they don't confront the real problem — the MS-DOS world's underlying lack of hardware and software standards.

Sending a file to a printer is an uncomplicated task in the Mac environment, not because of the graphical interface, but because Apple designed its computers, printers, networks and operating system from the ground up to work as a tightly integrated system.

Even with a graphical interface, PC users still face a bewildering permutation of peripherals, network protocols, file formats and software kludges that are often necessary to make the PC handle tasks it was never designed to perform.

Worse, the Windows and Presentation Manager graphical environment falls considerably short of the Mac original in key ergonomic areas. Rather than insulate the user from nuts-and-bolts problems at the operating system level, Microsoft has mysteriously chosen to retain some of the least intuitive features of the traditional DOS environment, including cryptic eight-character file names, an obscure command language and navigation by way of directories and paths.

Myth III: Without a common graphical user interface, the software industry will never settle on any meaningful software standards.

Microsoft and IBM would like users to believe that Windows and the Presentation Manager represent the only possible standard for graphical interfaces. In reality, there are a growing number of competing environments — such as Tandy's Deskmate and the Sun-AT&T Open Look which developers have used to create graphical applications that are Mac-like and legal.

Moreover, the ruckus over graphical interfaces obscures the fact that there are already some significant interface designs that have quietly become de facto industry standards. Lotus's moving-bar menus, Software Publishing, Inc.'s PFS interface and Ashton-Tate's Framework format are familiar to literally millions of users and continue to serve as models for software developers.

Jeffrey Tarter is editor and publisher of "The Soft-Letter," a Cambridge, Mass.-based newsletter for software developers and publishers.

Laptop

FROM PAGE 29

cellular telephone and modem/cellular interface.

In addition to sending and receiving data, the cellular phone can be used for more mundane tasks such as calling the boss, a spouse or a customer. Total cost is $4,995 to $5,500, depending on configuration.

And while many laptops include a modem, these devices require access to a telephone. But Microdirect's cellular capability allows users to communicate with host systems from almost wherever they happen to be, the company claimed.

The laptop, based on the Intel Corp. 80C88 processor, comes standard with 1M byte of random-access memory, two 720K-byte 3½-in. floppy disk drives and a built-in 1,200-bit/sec. Hayes Microcomputer Products, Inc.-compatible modem. A 20M-byte hard disk drive is optional. Systems are also available without a printer or telephone.

The systems, which come with a one-year warranty, are serviced through Bunker Ramo in more than 80 U.S. cities.

Lotus CD

FROM PAGE 29

ings and loan institutions, high technology businesses and U.S. public and private companies.

CD/Corporate will be sold through the Lotus direct sales force, and requires an IBM or IBM-compatible Personal Computer with a hard disk drive and 640K bytes of memory, according to the company.

Users requiring access to CD/Newsline need a 1,200- or 2,400-bit/sec. Hayes Microcomputer Products, Inc.-compatible modem.

HP to sell Laserjet accessory

BY JAMES A. MARTIN
CW STAFF

PALO ALTO, Calif. — Hewlett-Packard Co. has recently announced that it will support and distribute the QMS, Inc. Jetscript accessory kit, which reportedly provides the HP Laserjet Series II printer with Adobe Systems, Inc. Postscript page-description language capabilities.

The $2,795 Jetscript accessory kit, released by QMS earlier this year, includes a full-sized add-in board with 3M bytes of random-access memory that plugs into any IBM Personal Computer AT, XT and compatible and the Personal System/2 Model 30. Also included is another circuit card for the Laserjet I/O slot, Postscript interpreter code and soft fonts to be installed on the IBM PC board and connecting cable.

According to the company, the Jetscript kit is available immediately.

A match made in heaven

The marriage between Postscript and Laserjet was inevitable and much anticipated, analysts said.

Postscript's popularity began in the Apple Computer, Inc. laser printer market and has recently been adopted by many IBM PC-compatible printer manufacturers.

While the HP Laserjet is a top seller among IBM PC and compatibles users, its proprietary printer command language, PCL, does not support Postscript.

Clone maker

FROM PAGE 33

been just plain intimidation to gain time in the market?
I thought IBM was reasonably clear in what it said as far back as six to nine months ago. The message was that IBM certainly intended to protect trade secrets, trademarks, etc. but that it has a standard policy of licensing a patent portfolio.

Too many people asked the wrong question, which was, "Will you license the Micro Channel?" IBM said no. The right question would have been, "Will you license the patent portfolio, which includes potentially some Micro Channel patents?" IBM's answer to that has always been consistent: Yes.

Now that Micro Channel clones are coming out, is it possible IBM might make some changes to the Micro Channel to throw the clone makers off?
We visited IBM during the first year of Chips' existence and said, "Look at the wonderful job we've done with a chip set that allows you to build an AT with one-fifth the amount of chips. Why don't you throw out your old design, use our design and have great cost savings?" They looked at us, chuckled and said, "You just don't understand."

It turns out that when IBM brings out a model like the AT, they have to fill the distribution channel and support it with spare parts and service manuals. This pipeline is so large that a single change in something in that pipeline would wipe out the savings from a new chip set.

What that illustrates is that it's very difficult for IBM to continually make changes when they introduce a machine. What we will see, I think, are new models being introduced more rapidly and the possibility of tying IBM hardware to its software.

Can you successfully have Micro Channel features — like the multiple master arbitration scheme on an AT bus — that allow multiple processors to act in unison?
To try and change the AT bus you would end up with no add-in cards. If you try to add additional control signals or diagnostic signals, which are in the Micro Channel, you wind up with a nonstandard AT bus and cards that won't work except with a standard AT bus. The two standards will have to coexist for some time, but until we get some software or some reasons to use it, I wouldn't buy a PS/2 for my secretary. If there was an application she could use, I would.

Are you seeing much interest in the Model 30 chip set now, or are most vendors interested in the Micro Channel?
There doesn't appear to be an overwhelming interest by compatible manufacturers to do that machine. The compatible guys will probably go for an Intel 80286-based Model 30, which would be a much more successful machine. IBM has said that almost all its PCs in the future will be 80386-based, with some 286 stuff at the bottom. So, I don't think we'll see a lot more 8088- or 8086-based machines.

The dynamic RAM shortage is doing a lot to kill the low end, too. It turns out that the first machine vendors kill is the one that doesn't have enough margin.

There have been reports that Chips and Technologies is designing a 386-compatible microprocessor using hard-wired logic, instead of microcode, as a way of skirting around microcode copyright patent issues. Is there any truth to those reports?
There's been a lot more speculation about that than is merited.

What do you think might happen with the Intel 80486 microprocessor?
If IBM really wants to outdistance the competition, it would change or modify the Intel microprocessor used in its machines. It's not clear that it's in their best interest to continue with a standard processor. So with the 486, I'm not sure IBM will standardize on it. It might be used just in specialty niches.

Systems software for MVS data centers:
Enter the world of total
Introducing CA-UNIPACKS™ from Computer Associates' groups of superior products working together – providing cost effective, total solutions that automate every major functional area of the MVS data center.
SECURITY, CONTROL AND AUDITING (SCA)
Access control, network security, system audit.
DATA CENTER ADMINISTRATION (DCA)
Problem control, change management, inventory and financial control.
AUTOMATED PRODUCTION CONTROL (APC)
Automating: job scheduling, console operations, print management, report distribution.
STORAGE AND RESOURCE MANAGEMENT (SRM)
Tape and DASD management, sorting, disaster recovery.
PERFORMANCE MEASUREMENT AND ANALYSIS (PMA)
Capacity planning, network management, performance measurement, resource accounting, system analysis.

NEW PRODUCTS

Systems

An electronic filing and imaging system has been announced by Ovonic Imaging Systems, Inc.

For users of IBM Personal Computer XTs, PC ATs and compatibles, the system's key components are **Paperchase Software** and the **Paperchase Interface Card,** which allow personal computers to function as personal imaging systems.

The interface card currently operates with Canon U.S.A., Inc. sheet-fed desktop scanners and Canon or Hewlett-Packard Co. desktop laser printers.

Paperchase Software carries a single-copy price of $695. The Paperchase Interface Card is priced from $595 to $1,195.

Ovonic Imaging Systems, Inc., 1896 Barrett St., Troy, Mich. 48084. 313-362-3140.

CPT Corp. has announced an addition to the CPT 9000 series of IBM Personal Computer AT-compatible workstations.

The **CPT 9286,** based on the Intel Corp. 80286 processor, has a clock speed of 8 or 12.5 MHz and includes 1M byte of memory. The system supports as many as two floppy disk drives and three half-height internal hard disk drives. A standard configuration includes one 5¼-in. 1.2M-byte floppy drive, with additional 5¼- and 3½-in. floppy disks available. Users may select either a 20M- or a 40M-byte hard drive.

The CPT 9286 offers a standard half-page, 12-in. amber monitor and a full-page, high-resolution, black-on-white 14-in. monitor.

Prices for the base-level CPT 9286 with a half-page monitor, one 5¼-in. disk drive and an AT-style keyboard start at $2,695.

CPT Corp., 8100 Mitchell Road, Minneapolis, Minn. 55440. 612-937-8000.

Software applications packages

TAP Development Corp. has announced **Advanced Lotus 1-2-3,** a teaching assistance package and continuation of its Spreadsheet Module.

Using 112 multicolor slides to expand on the information the module provides, the package includes a review of Lotus Development Corp.'s basic Lotus 1-2-3, Global Commands, Advanced Functions, Range Commands and Macros.

The one-day course costs $990.

TAP Development, Suite 200, 1820 E. Sahara Ave., Las Vegas, Nev. 89014. 800-231-5455.

Software languages

Key LISP, an implementation of LISP for Apple Computer, Inc.'s Apple II, has been released by **Xprime Corp.**

The product runs under ProDOS with a minimum of 64K bytes on Apple's Apple II, II Plus, IIE, IIC and IIGS. An 80-col. display is recommended for the Apple II, II Plus and IIE.

Key LISP offers more than 220 features, including floating-point calculations, identifier names of unlimited length, automatic type conversion and user-definable macro characters. LISP macros are fully supported.

Key LISP is priced at $149.

Xprime, 10835 Santa Monica Blvd., Los Angeles, Calif. 90025. 213-470-4663.

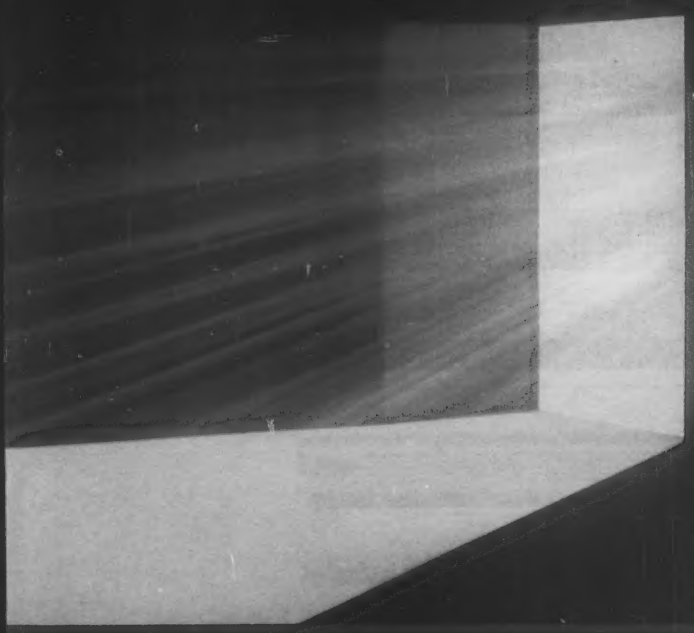
solution, total support.

Only Computer Associates has the breadth of product and depth of expertise to automate entire areas with integrated software. The resulting synergy maximizes productivity – freeing up staff and reducing backlogs. The more CA-UNIPACKS you install, the more benefits you'll realize.

And only Computer Associates offers CA-UNISERVICE™, a uniquely effective concept in support. The PC workstation component provides a secure link between your mainframe and Computer Associates' Customer Service System – 24 hours a day. CA-UNISERVICE gives you online access to software fixes, interactive problem resolution, computer-based mainframe product training, and more. CA-UNISERVICE. No one else has anything like it.

Enter the world of total solution, total support. Call Dana Williams today:

1-800-645-3003 (Ext. 1018).



© 1988 Computer Associates International, Inc.
711 Stewart Ave., Garden City, N.Y. 11530 4787

COMPUTER ASSOCIATES
Software superior by design.

- World's leading independent software company.
- Broad range of integrated business and data processing software for mainframe, mid-range and micro computers.
- Worldwide service and support network of more than 80 offices.

Resource & Operations Management • Financial • Banking • Graphics • Spreadsheets • Project Management

MVS Programmer's Apprentice

Over 180 subroutines, utilities and commands:

- File & string manipulation
- Testing aids
- Debugging
- Cross memory communications
- Access to TSO & MVS functions

(312) 525-6400

ChicagoSoft

IBM displays are getting attached to DEC, Data General and Prime® computers.

Model 110/160

The fact is, IBM® 3151 ASCII displays are getting attached to all kinds of multi-user systems.

It's not surprising. IBM 3151 displays are inexpensive both to buy and own. Model 160 starts at $399,* including one-year warranty. Other models are available with a 3-year warranty. Add an IBM Maintenance Agreement, and you'll get five years of IBM service for just $54.

The 3151 family of displays provides most of the popular emulations compatible with DEC,™ Wyse,® Data General,™ TeleVideo® and more. Models 310 and 410 utilize unique cartridges which provide additional capabilities: auto dial, PC compatibility and concurrent dual host connectivity.

IBM ASCII displays are everything you'd expect from the company that ships more terminals than anyone. All models are equipped with high-quality IBM keyboards, designed for use with your ASCII applications. Non-glare 14" flat screens in green or amber/gold provide crisp character resolution.

How can you get attached to an IBM ASCII terminal?

For a free brochure and to find a distributor near you, call 1-800-IBM-7257 ext. 84. Or call your IBM Marketing Representative.

IBM®

Model 310/360

Model 410/460

*This is IBM's single unit price for a purchase from IBM exclusive of taxes and shipping. Dealer prices may vary. Price is subject to change without notice. Prime is a registered trademark of Prime Computer, Inc., Natick, MA. Data General is a trademark of Data General. Wyse is a registered trademark of Wyse Technology. TeleVideo is a registered trademark of TeleVideo Systems, Inc. DEC is a trademark of Digital Equipment Corporation. IBM is a registered trademark of IBM Corporation. © IBM 1988.

DATA STREAM

Merv Adrian

Common idiom needed

Why can't our applications talk to one another? You use a Compaq and I use a Mac — so what?

We want the ability to move data easily between spreadsheets or data bases, even to move graphics files across the operating system barrier, without losing the rich meaning encapsulated in the application formatting. This is the latest connectivity frontier, one that vendors are just starting to cross.

A lot of attention has been given to networking protocols like Transmission Control Protocol/Internet Protocol (TCP/IP) and the Open Systems Interconnect (OSI) model, which were designed to standardize information movement from one system to another.

You would think that when we finally have mature, industry-wide networking standards, the desktop user will be able to move comfortably to the correct desktop environment for a particular task.

For example, install an Ethernet network running TCP/IP or the upper layers of OSI. Keep a couple of Apple Macintoshes for the publishing applications, a Sun workstation or two for the really high-powered scientific and engineering programming tasks, add an IBM Personal System/2, and you've built the working environment of your dreams.

Continued on page 42

Customer service tops the list

Tymnet's Fenn steers firm through shifting waters of user environment

The explosion of mergers and acquisitions in the business world, coupled with the need to utilize technology for competitive advantages — for example, to increase product and service delivery — is pressuring corporate network users to find even more cost-effective alternatives.

Tymnet, McDonnell Douglas Network Systems Co.'s new president, Al Fenn, formerly vice-president of network technology development, shared his views with *Computerworld's* West Coast Bureau Chief Kathy Chin Leong during a recent interview. His vision for the packet-switch vendor includes migrating Tymnet's business strategy to accommodate the changing nature of the corporate user environment.

Tymnet's Fenn

Can you respond to reports that Tymnet has been losing money?

We can't give out levels of detail, but I can tell you this: We are expanding our sales efforts. For 1987 and 1988, we have been increasing expenditures in R&D as a percent of sales. This makes a statement about Tymnet investing in its own business. We think the business is healthy and growing. It is an attractive marketplace. The negative viewpoints of the packet-switch business are wrong.

What are Tymnet's top priorities right now?

At the top of the list is customer service — ensuring that we have the kinds of products and services customers need, and that we deliver quality products that are reliable. My No. 2 goal is to broaden our general business structure. Instead of focusing only on packet switching, we need to include support for T1, voice and so on.

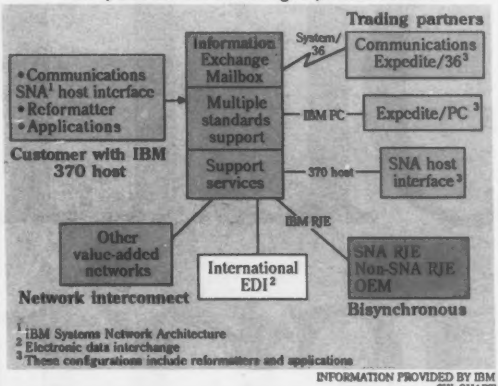
Packet switching is clearly competing with other technologies. Is that why Tymnet decided to become a systems integrator?

Continued on page 41

Data View

IBM's view of EDI

Users of EDI Services link through Information Network



INFORMATION PROVIDED BY IBM
CW CHART

EDI gets users' OK

BY KATHY CHIN LEONG
and PATRICIA KEEFE
CW STAFF

SAN FRANCISCO — Electronic data interchange (EDI) is a sleeper technology and the antithesis of Integrated Services Digital Networks (ISDN), according to Thomas Nolle, a consultant and president of CIMI Corp.

Characterizing ISDN as a "product technology in search of interested users," Nolle claimed EDI is just the opposite. "Users are really interested and willing

Continued on page 42

Users look inward for net service

BY PATRICIA KEEFE
CW STAFF

LEXINGTON, Mass. — Finding network management that supports a range of systems and software is not the only issue frustrating users today. Those concerns extend to network maintenance and support — and who specifically should provide it.

Fortune 1,000 network and MIS managers who participated in two recent focus groups said they preferred to utilize in-house network support staff rather than contract with outside vendor services for maintaining their communications facilities.

However, many of these same users added that they would be glad to turn these responsibilities over to a third party, providing it could demonstrate reliable and professional network service support capabilities.

A long way to go

The results of the focus groups made it clear that these managers think vendors have a long way to go.

Two focus groups, sponsored in March by The Ledgeway Group, Inc., a research and con-

Continued on page 44

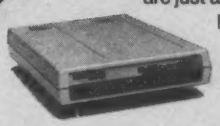
Inside

- Spectrum Concepts, CDC join forces to provide EDI to users. Page 40.
- Telebyte Technology designs controller to simplify wiring between VAX, Microvax systems. Page 45.

Modems, Multiplexers, and Much More...

Warning: Bargains can be hazardous to your network.

Some people feel that price is the only thing that matters when it comes to modems. Our customers feel differently. If you also feel that quality, support and company stability are just as important as price, we offer you our 2400/1200 bps error-correcting MultiModems,™ in desktop, internal PC and rack-mounted versions.



And if your network is ready for multiplexing, we offer our MultiMux™ 4- and 8-channel statistical multiplexers.

MultiModems and MultiMuxes are manufactured in Minnesota by Multi-Tech Systems (as they have been since 1970), and provide exceptional quality at an economic price. If you are not already a Multi-Tech modem or mux user, please call us toll-free today, at

1-800-328-9717.

MultiTech Systems

Multi-Tech Systems, Inc. • 82 Second Avenue S.E. • New Brighton, MN 55112 • (612) 631-3550 • (800) 328-9717 • FAX 612-631-3575 • TWX 910-563-3610

Users file ONA grievances with FCC

BY MITCH BETTS
CW STAFF

Business network users groups, as part of their attack on the Open Network Architecture (ONA) plans of the regional Bell holding companies, have drawn up a list of complaints covering pricing, usage restrictions and the protection of confidential information.

Comments filed with the Federal Communications Commission April 18 showed that some groups — such as the Association of Data Communications Users and the International Communications Association (ICA) — opposed the ONA plans, mostly because they lack national uniformity and fail to unbundle local network services [CW, April 25].

Also, according to the association, the ONA plans offer very few features that are not already currently available.

In addition to those concerns, the users groups identified the following problems:

- Only Ameritech's plan has a strong commitment to cost-base pricing of ONA services. The other plans hinted that ONA prices will be what the market will bear.
- Many basic service elements are treated differently in each of the seven ONA plans, causing confusion.
- Bellsouth Corp. and Southwestern Bell Corp. plan to restrict the ONA services available to end users, as distinguished from enhanced service providers.
- The ONA plans do not adequately protect users' proprietary network information from disclosure or abuse.

BIT BLAST

EDI users get LU6.2

Spectrum Concepts, Inc. and **Control Data Corp.** (CDC) have inked a pact that reportedly will provide electronic data interchange users with access to Spectrum's Xcom 6.2 LU6.2-based data transmission software when they are connected to CDC's Rednet public data network. LU6.2 provides an alternative to traditional bisynchronous communications networks.

Xcom 6.2 can boost data throughput by compressing both character and binary data, a difficult feat in a bisynchronous environment, Spectrum said. LU6.2 allows software to be written independently of the computer and operating system.

GE Information Services, a division of General Electric Co., recently enhanced the All-In-1 Connector Software Package, software said to interface its Quick-Comm electronic mailbox service with Digital Equipment Corp.'s All-In-1 Mail system. Version 3.1 interfaces an additional DEC mail capability, VMS Mail, with Quick-Comm.

Electronic Data Systems Corp. (EDS) has agreed to purchase **M&SD Corp.** in Lyndhurst, N.J., a privately held telecommunications services supplier that also serves a consortium of 50 companies. Terms of the acquisition were not disclosed. M&SD will be organized as a division of EDS Communications Corp. EDS bought M&SD to get a crack at its customer base, which includes more than 200 Fortune 1,000 companies.

Octel Communications Corp. has announced that **Southwestern Bell Corp.** will be using several Octel Aspen Maxum voice processing systems for certain voice-messaging field market trials slated to begin this summer under the telephone company's recently filed Comparably Efficient Interconnection Plan. The trials involve limited voice mail and telephone answering services in selected wire centers within Southwestern Bell's five-state service area.

Most OLTP isn't.

Fenn

FROM PAGE 39

We are not getting into systems integration [for that reason]. The competition between packet switching and other alternatives is not the main factor — maybe the third one. We are doing it in order to meet customer requirements. Packet switching doesn't serve all user needs.

Is there a new type of user being drawn to packet switching?

There are some things happening out there that are different now. I call them multicorporate users. Corporation A wants to talk to Corporation B, which wants to communicate with Corporation C. Packet switching clearly has advantages for that. Customers are also deciding they need to connect internal computer systems in a safe and efficient way. Merging two large [IBM Systems Network Architecture] networks is not a trivial thing to do. But we have had experience helping customers do that.

What are the differences between private network and public network users?

There is a wide spectrum between the two. The important reason for private is cost-related or control-related. They want to control it fully or absolutely minimize cost in highest traffic areas. People with public network solutions are targeting locations with lower density traffic, a wide geographic arena or third parties. The argument for these users is that they don't want to control the network and prefer to let the vendor deal with it.

Will these camps merge?

It is happening in almost every case. In places where we install private networks, we find growing use of the public Tymnet packet-switching network. We can offer a private network gateway into our public network.

Where is packet-switching technology headed?

[The technology is moving toward] building switches that are bigger and faster, [as well as] smaller and faster. As people have more traffic, the switches must get bigger and faster and be able to provide the performance required. At the same time, you must get switches smaller and faster to spread the technology to lower density locations. You must go in both directions. There is a third-direction functionality. We see the packet-switching arena expanding to pick up integrated protocol conversion and other functions. The cost will vary on traffic load.

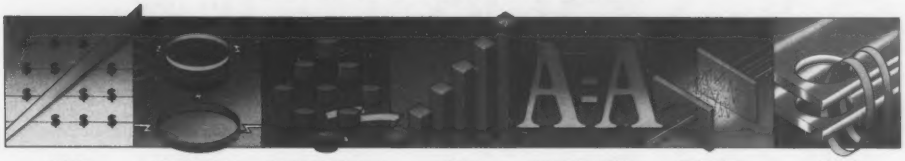
How do you stay in touch with your users?

We survey them several times a year. We have multiple users groups: one in Europe, one in the U.S. focused on the public network and another in the U.S. concentrated on private network activities. I visited three customers my first month on the job. We encourage customers to visit us here in San Jose. Executive management participates in the visits. As a matter of priority, we are increasing the executive visibility with users beyond the simple sales calls.

Any comment on the recent Open Network Architecture (ONA) filings from the divested Bell operating companies?

We are very disappointed. There is a wide range in the quality of the filings, and we have a long way to go before key ONA issues are resolved to anyone's satisfaction. The filings put vendors like us at a disadvantage. It is not a surprise. Just think about the major communications users in the U.S. who will have to deal with all the differences in these filings.

OLTP fundamentals.



PRICE PERFORMANCE · NETWORKING · DISTRIBUTED DATA · LINEAR EXPANDABILITY · DATA INTEGRITY · SECURITY · FAULT TOLERANCE

If you don't have them all, you don't have OLTP.

ON-LINE TRANSACTION PROCESSING is the most demanding discipline in data processing. From small systems to worldwide networks, it requires on-line access to a shared database with full data integrity, full security and no downtime. You must be able to distribute data wherever needed, and it all must operate with the simplicity of a single system you can expand in any increment you choose.

WHO MEASURES UP TO TANDEM? Frankly, nobody. OLTP at Tandem is not a redesign or a retrofit. It's been our business through all the years we've been in business. Based on a single operating system and compatible hardware, it comes with excellent price/performance and full service and support. It's also easy to integrate with your existing system.

COMPARE US TO ANY OTHER OLTP SYSTEM. You'll see why companies in every major industry run critical applications on Tandem systems. For more information, write: Tandem Computers Incorporated, 19191 Vallco Parkway, Loc. 4-31, Cupertino, CA 95014. Or call 800-482-6336.

TANDEMCOMPUTERS
OLTP is On-Line Tandem Processing.

C5021

VM/CMS USERS

Developing Applications?

Use XMENU/E for Total Full-Screen Support.

- Powerful REXX interface
- Fast screen painter
- High-level language support
- Extensive validity checking
- Complete 3270 support

Call Now: 408/980-9414

Kelinar Corporation

3064 Scott Blvd., Santa Clara CA 95054

Adrian

CONTINUED FROM PAGE 39

There is, however, one thorny problem with this scenario that OSI and the like do not solve — data exchange at the applications level that preserves content. It can be done, increasingly with very sophisticated extraction capabilities. The trouble is, the facilities for making intelligent use of that data are primitive.

It's not the software products themselves that are the problem, it's their data-capture functions. For most products, bringing in data is a chore for which you program an input routine, or translate the file at the sending end into an accepted exchange format (like the U.S. Navy's Data Interchange Format or Lotus Development's WKS, WK1 and so on, for spreadsheets or ASCII for text) and then retranslate it when it arrives at the other end.

In the process, a lot of semantics are lost and, more to the point, so is much of the valuable time and effort put in by creative people. You can't carry formatting information with text, or formulas with spreadsheets, and you may as well forget about the intelligent communication of graphics information. You could work with bit maps, but that requires a great deal of bandwidth. Moreover, structures based on graphics primitives, like the widely used meta files in the DOS world, don't translate from one architecture to the other easily, if at all.

So, a call to vendors: There is a critical mass, there are examples and there is the need for rich application-level information exchange. Call it "data interoperability," call it "platform transparency," but give it to us!

The critical mass results from one simple fact: Corporate America is buying Macintoshes. A lot of Macintoshes. And, as noted above, they are able to hook them up, in a variety of ways, with the DOS-based machines that are the staple desktop tool in business today. They can easily copy files back and forth.

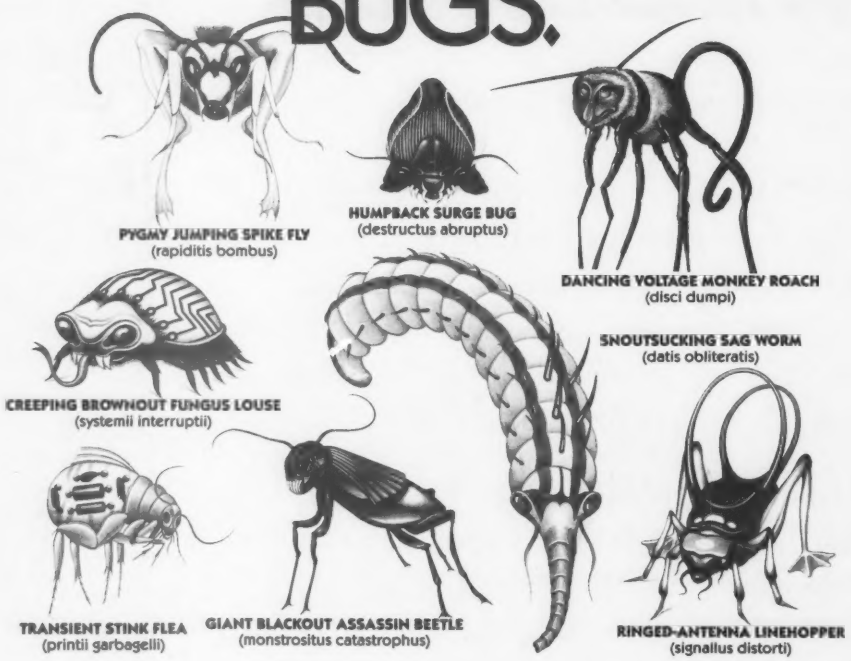
Yet, to make use of those files, they often have to reduce the content to a stripped-down subset of the original document.

Examples of a better way? Start with Microsoft Word from Microsoft. A staple word processing package in both the Mac and IBM Personal Computer environments, it is one of the few products that offers support in each version for the other machine's format. If you can handle the physical access question (not trivial, because of differing disk standards, but solvable with networking), Mac Word can read Microsoft's MS-DOS Word files, and vice versa.

Clearly, it is time for vendors to provide, and promote, applications interoperability. More to the point, those who don't will be in danger of being left behind.

Adrian is editor of *NYPC* and *FOCUS Systems Journal*, and author of *The Workstation Data Link*, published by McGraw-Hill, Inc.

KNOW YOUR BUGS.



If you've been having problems with your computer, chances are they are electric power related. Power problems can cause these eight computer pests. To get rid of them fast, call Onan.

Onan offers a complete line of equipment to eliminate these 8 pesky electrical problems. From high isolation transformers and line conditioners to standby battery power, uninterruptible power systems and generator sets, Onan is one of the leaders in solving power problems for today's computers.

For more information on power problems and how to solve them, call or write Onan or its local Distributor (see Generators in Yellow Pages) for a copy of Onan Technewsletter 10. A 17" x 22" poster of this ad is available upon request.

COMPUTER POWER BUGS, WE EAT 'EM ALIVE.

Onan

1400 73rd Ave. N.E. • Minneapolis, MN 55432

1-800-888-ONAN

EDI users

CONTINUED FROM PAGE 39

to grapple with the technology."

He said the standard user response to ISDN has been, "I don't know what this is, I don't believe in it, and I don't need it." Conversely, Nolle, who attended the recent ANSI X12 EDI conference here, summed up the attitude of 1,100 attendees as "Despite the fact that I don't know what these people are talking about, I need this."

At least one user company, Burlington Northern, is so determined to enact an EDI system, that it rented a booth on the exhibit floor, solely for the purpose of promoting its ability to trade electronically, as though it were a service it was offering its business partners, Nolle said.

A hot two-pronged issue came out in a lot of the sessions: There are a series of technical issues that are attached to EDI that business and financial personnel are not equipped to deal with; and, there are a series of organizational and business issues that technical staff cannot handle.

This is important because unlike the implementation of some other technologies, designing a successful EDI system really has to be a joint venture between the technical and business sides of the house.

Conference attendees also got an update on ANSI X12. The completed portion of the X12 standard has been in use since 1983, when the first documents were approved for purchase ordering and invoicing. Since then, more than 14 documents have been approved, covering generic aspects of the supplier-customer business.

"Many people are not really aware that X12 is a body of standards, only parts of which have been completed," Nolle said. This fall, ANSI will make all 50 documents, including early drafts, available for review. Afterward, ANSI will vote.

Approximately 20 working drafts have yet to be approved for a variety of features, said Harriet Rusk, executive director of Data Interchange Standards Association, Inc.

Standards setting has created some level of polarization between users and vendors, Nolle said. Each industry has a council that pretty much controls the EDI standard for that market. These councils are reluctant to hand over their standard-making authority to ANSI because they believe the organization's review process for moving X12 forward takes too long, he said.

While Other Companies Are Building Computers, TeleVideo Is Building Solutions.

TelOAS From TeleVideo. Open Architecture Solutions.

When Dr. K. Philip Hwang founded TeleVideo in 1975, he began a company that would never cease searching for solutions to the needs of customers. The new TelOAS open architecture computer systems are the latest in a long line of those solutions.

TelOAS is more than a computer system. It's a new way of looking at solving your computer needs. TeleVideo engineers created a system that can be anything you need it to be. From a data entry terminal to a powerful CAD/CAM workstation to a LAN fileserver, TelOAS combines power and flexibility in a system every user can afford.

TelOAS protects your investment by combining the latest technology with industry standard hardware and software. To give you added assurance, standard TelOAS models include one-year limited ON-SITE warranty* service from Intelogic Trace with over 250 service locations. All standard TelOAS models come bundled with MS-DOS™ and BASIC to give you access to the widest range of software available. It's all there to make sure TelOAS open architecture systems will meet your needs today, and grow in the future.

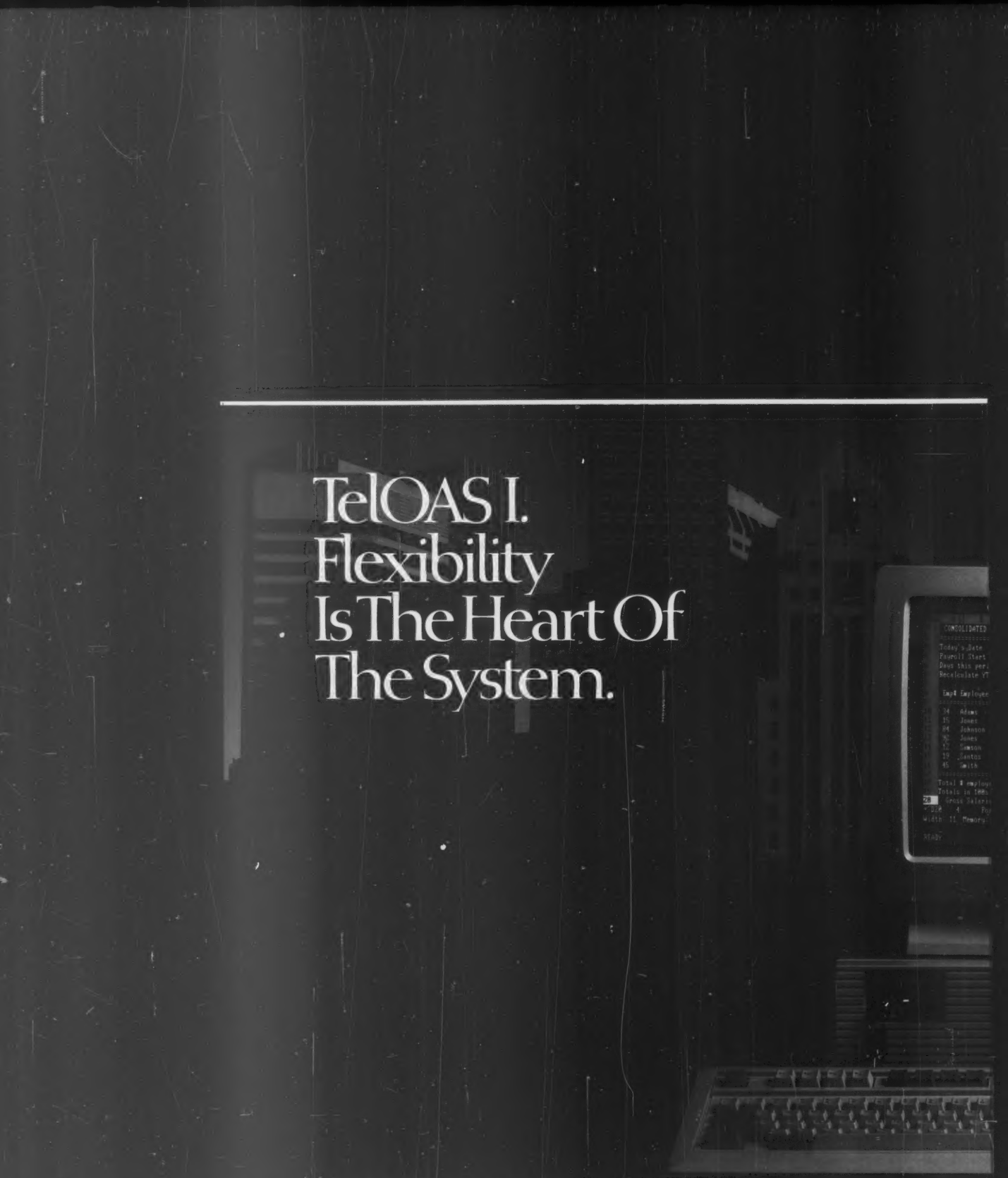
*U.S. only

Standard TelOAS Configurations Matrix

Product	Model	CPU/ Speed	Standard RAM	No. of Slots	Floppy	Hard Disk	Keyboard	Video Board	Monitor	Power Supply
TelOAS I	NH	88/8	512K	4	360K	Optional	AT	MD/Her/CGA	Optional	80W
TelOAS II	NH	286/12	1M	8	1.2M	Optional	Enh. AT	Optional	Optional	155W
TelOAS II	20	286/12	1M	8	1.2M	20M	Enh. AT	Optional	Optional	155W
TelOAS III	NH	386/16	1M	12	1.2M	Optional	Enh. AT	Optional	Optional	240W
TelOAS III	40	386/16	1M	12	1.2M	40M	Enh. AT	Optional	Optional	240W
TelOAS III	70	386/16	1M	12	1.2M	70M	Enh. AT	Optional	Optional	240W
TelOAS III/20	NH	386/20	1M	12	1.2M	Optional	Enh. AT	Optional	Optional	240W
TelOAS III/20	70	386/20	1M	12	1.2M	70M	Enh. AT	Optional	Optional	240W

8088
80286
80386

TelOAS I. Flexibility Is The Heart Of The System.



The key to the new TelOAS Open Architecture Solutions is being able to build the computer that's right for your applications. Our modular design lets you choose the TelOAS CPU you want: an 8 MHz 8088, a 12 MHz 80286, or your choice of a 16 or 20 MHz 80386. Now choose the drives you want, the monitor, keyboard, and the footprint you want. Then combine them in the configuration that gives you the solution you need. When your needs change, the TelOAS system changes right along with you.

We didn't forget that even the most flexible system has to work in the real world, so we made sure the TelOAS system is compatible with industry-leading software to give you access to the most versatile and powerful programs.

TelOAS I packs a lot of power and versatility into a very compact 4" high package. Its open-architecture passive backplane design gives it great flexi-

bility. The passive backplane has four full slots (three 16-bit and one 8-bit) and room for two half-height drives. To make your connections, there's one serial and one parallel port.

To keep everything safe and sound from unauthorized use, there's a convenient front-mounted security lock with removable key.

There's also a LED On-Off power switch/reset key that falls right at hand. A small point, but an indication of the care TeleVideo engineers took designing our most advanced system ever.

The standard TelOAS I configuration includes an 8088 CPU, 512K RAM, 360KB floppy disk drive, floppy disk controller, Hercules®/CGA graphics controller and 84-key AT compatible keyboard. It's shown here with the optional high-resolution 14" amber screen monitor.

TelOAS II. Advanced Technology Is The Brain Of The System.

The TelOAS Open Architecture Solutions use some of the most advanced design and assembly technologies to deliver computers that are as dependable as they are powerful.

TelOAS advanced passive backplane technology makes it easy to upgrade your system as your needs change. Increasing memory can be as easy as plugging in a new TelOAS Single Inline Memory Module (SIMM). Slip out your half-height drives, slip in full-height hard disks and you can have to up 300 MB storage capacity, enough to run sophisticated System Fault Tolerant backup systems and LAN configurations.

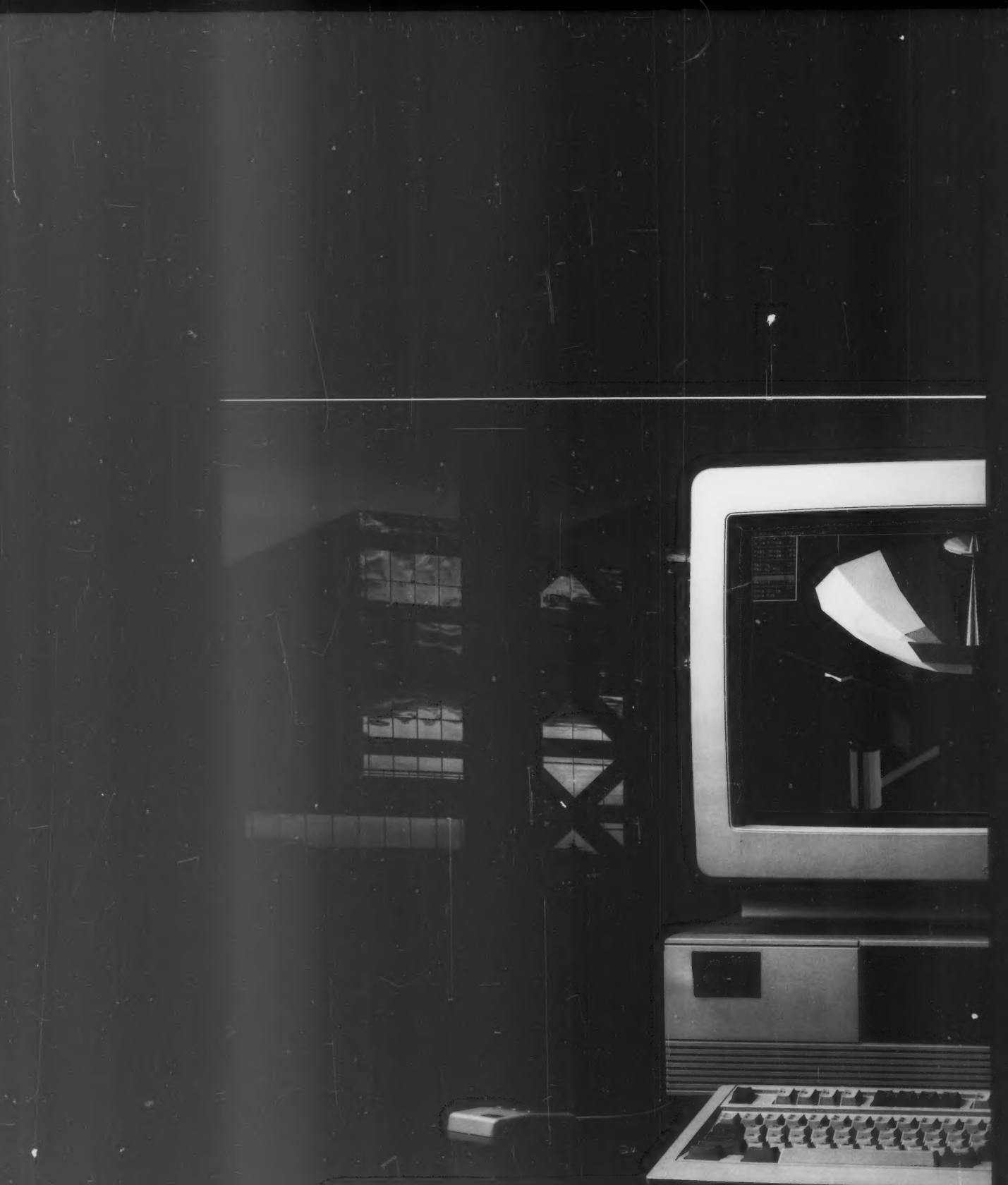
Our Surface Mount Technology (SMT) increases the functionality and reliability of TelOAS computers, and decreases their

power consumption.

And that's enough to make even a power user smile.

TelOAS II increases your flexibility with a choice of TelOAS 12 MHz 80286 or 16 MHz 80386 CPUs, plus a socket for an 80287 or 80387 coprocessor. The passive backplane has eight full slots (seven 16-bit and one 8-bit), and room for four half-height drives. There are two serial and one parallel port, a security lock with removable key, and a LED On-Off power switch/reset key.

The TelOAS II standard configuration includes a 12 MHz 80286 CPU, 1 MB RAM, 1.2 MB floppy disk drive, floppy and hard disk controllers, and 101-key Enhanced AT keyboard. We've shown it here with an optional 13″ color monitor.

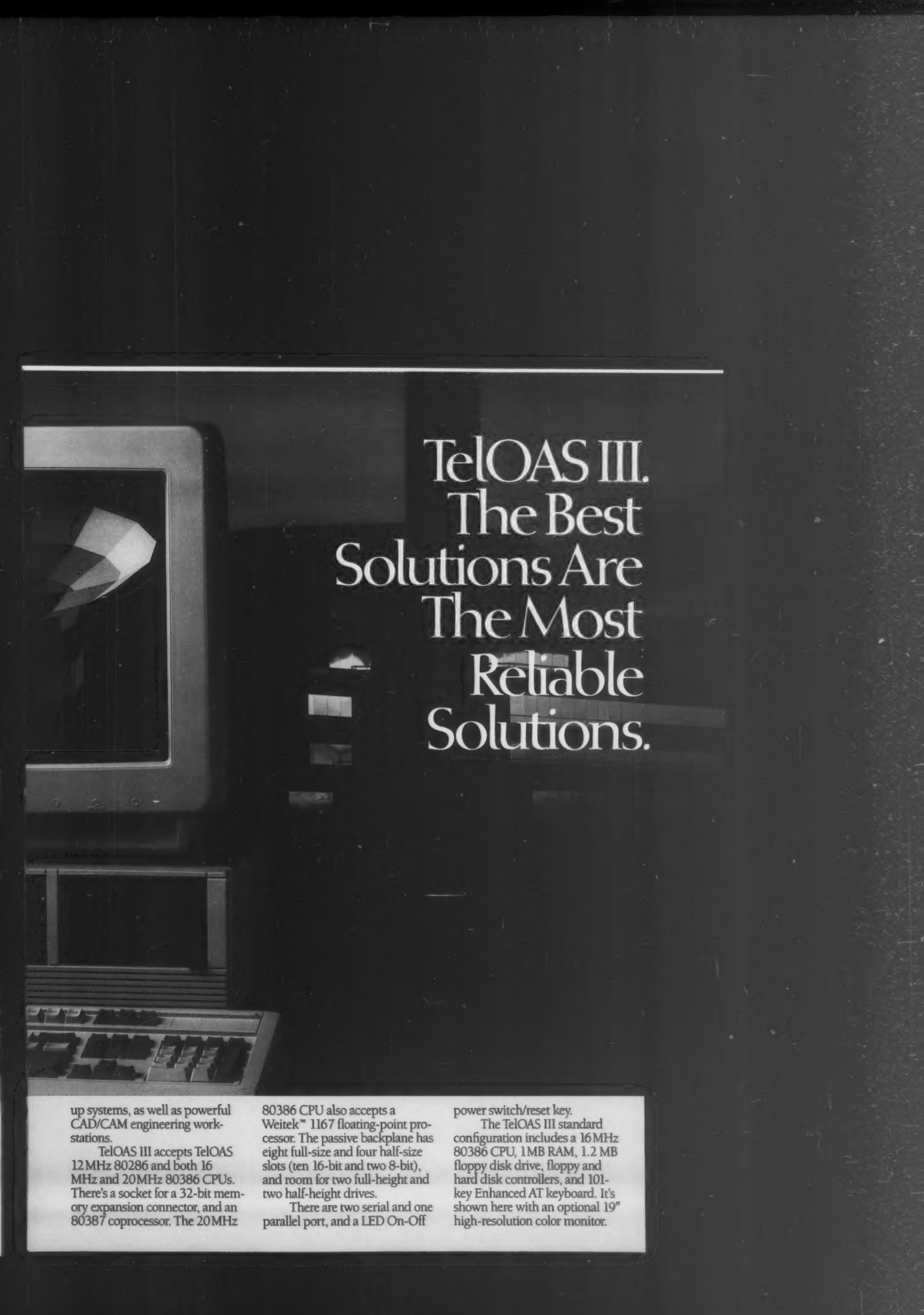


While TeleVideo's engineers were designing our most powerful and most flexible computer system ever, they made sure it was also the most reliable.

TelOAS Open Architecture Solutions use the most advanced design and production technologies to reduce the number of parts in each system, and to make sure each of those parts maintains our stringent quality control requirements.

To make sure our computers remain very reliable and trouble-free, each TelOAS system has complete diagnostic features that give you extensive hardware tests.

TelOAS III is the top of the line, perfect for users who expect a lot from their computers. Unique for TeleVideo, TelOAS III can be configured to support up to 600 MB, giving users the capability to run large disk storage programs, LAN configurations and System Fault Tolerant back-



TelOAS III. The Best Solutions Are The Most Reliable Solutions.

up systems, as well as powerful CAD/CAM engineering workstations.

TelOAS III accepts TelOAS 12 MHz 80286 and both 16 MHz and 20 MHz 80386 CPUs. There's a socket for a 32-bit memory expansion connector, and an 80387 coprocessor. The 20 MHz 80386 CPU also accepts a Weitek™ 1167 floating-point processor. The passive backplane has eight full-size and four half-size slots (ten 16-bit and two 8-bit), and room for two full-height and two half-height drives.

There are two serial and one parallel port, and a LED On-Off power switch/reset key.

The TelOAS III standard configuration includes a 16 MHz 80386 CPU, 1 MB RAM, 1.2 MB floppy disk drive, floppy and hard disk controllers, and 101-key Enhanced AT keyboard. It's shown here with an optional 19" high-resolution color monitor.

TeleVideo has the perfect terminals to go with our TelOAS Open Architecture Solutions.

The affordable 905 is a very reliable ASCII terminal with all the basic features you look for in a data-entry terminal, priced with maximum economy in mind.

The bright new 900C color terminal lets you bring all the benefits of color to your monochrome applications. Just plug it in to take advantage of its 64-color palette and 14" non-glare screen.

The powerful 965 is perfect for just about everything. With an Enhanced PC keyboard, it's a low-cost workstation for your TelOAS system running DOS. As an ASCII or ANSI terminal with the corresponding keyboard, you can use it on your TelOAS system in a UNIX® multi-user configuration.

The 965 uses an ultra-reliable single board design with a 16-bit

TeleVideo Terminals. The Perfect Additions To A TelOAS System.

CPU and sophisticated gate array to give you all the power you need. Its 14" high-resolution flat screen displays up to 49 data lines to show large spreadsheets or two pages of text at a time. That's more than any other terminal in its class. It also supports up to 23 terminal emulations, again more than anything in its class.

And the 9320 is a DEC® VT320™ compatible terminal with more flexibility and features than the VT320. It has DB25 and DECconnect™ host and printer ports, two pages of display memory, and an enhanced VT320 keyboard.

All TeleVideo terminals come complete with TeleVideo's full one-year limited end-user warranty.

Which is just one more reason why TeleVideo terminals are the perfect choice.

Open Up All Kinds Of Possibilities With TeleVideo. Call 1-800-835-3228. Or,

☐ Please send me more information on the new TelOAS Open Architecture Solutions.
☐ Please send me more information on the complete line of TeleVideo terminals.

Name_____

Title_____ Telephone_____

Company_____

Address_____

City, State, Zip_____

Our company is an ☐ OEM ☐ VAR ☐ Distributor ☐ End User

Mail to: TeleVideo Systems, Inc.
1170 Morse Avenue, Sunnyvale, CA 94088-3568

TeleVideo®
THE VISION YOU NEED TO SUCCEED

We Laughed When You Sent Us Your Button Contest Entries!

Announcing the Winners of the 1988 Computerworld Button Contest.

When we challenged you in March to make us laugh, we were looking for humorous slogans for our annual button contest.

We got them.

Your response was impressive, to say the least. And your slogans were terrific. We received hundreds of responses from all over the United States. They were all quite good, so choosing just six winners was no easy task.

But it was enjoyable. Our panel of Computerworld judges was thoroughly entertained by your creativity.

Be sure to look for these buttons at upcoming trade shows and conferences — the 1988 buttons will debut at Comdex Spring, May 9-12, so stop by the Computerworld booth and pick up yours.

Congratulations to the winners and many thanks to all who entered. We'll see you again next year!

COMPUTERWORLD

An IDG Communications Publication

The Winning Slogans of the 1988 Computerworld Button Contest:

SEE US AT COMDEX - BOOTH #1214

Net service

FROM PAGE 39

sulting firm based in Lexington, were designed to examine the concerns of Fortune 1,000 firms. The results of those sessions are covered in a report titled, "Focus Groups with Users: Network/Communications Support."

The participants manage networks ranging from 25 to 3,000 nodes that support anywhere from 10 to 3,000 users. The majority said they have multiple local-area networks, adding that they felt the support issues facing them were the same on both the corporate and the departmental LANs.

The importance of network support is commiserate with the growth of networks themselves.

House staff fattened

This complexity has forced most of the participants to increase their in-house service and support staffs. And, the report notes, despite vendor claims to the contrary, the more sophisticated "intelligent" network management tools actually require better trained technicians to operate them and are not the cost-efficient systems they promise to be.

Because none of the new network management products address more than a specific vendor's segment of a user's network, the trend today is toward customer self-service, according to The Ledgeway Group. More than ever, users believe that in-house services will ensure greater network reliability and efficiency.

The managers cited a number of factors in support of in-house staffs. Perhaps among the most compelling is economics. "Because budgetary constraints continue to be network managers' greatest impediment to doing their jobs, in-house staff is perceived as a more cost-effective method of serving a company's network," the report said.

Just as important is the issue of multivendor integration. Other incentives include quick response to problems, familiarity with network requirements and the ability to design solutions to more fully meet applications needs.

Fear of outsiders

Many customers are hesitant to relinquish power over their networks to outside vendors, and for good reason, according to the managers who were interviewed.

Vendors lack reliable service and support organizations capable of responding quickly and thoroughly to user problems, the managers complained. They griped further that vendor service representatives tend to be unfamiliar with the customer's network applications and unable to deal with multivendor integration issues — a thorn in the side of many user systems today.

Among the recommendations offered by the focus group participants were that vendors must invest greater resources into their service and support functions, specifically the following:

- Work to better understand their customers' unique communications needs.
- Build a partnership with the customer by demonstrating this understanding and offering realistic solutions to meet their needs.
- Be proactive. Call on customers between emergencies to build a closer working relationship with the users.
- Sell and service two levels of the organization: the network manager and the senior staff. Educating senior staff about the real costs of networks will help the network manager justify the operating costs inherent in building and maintaining a network.
- Help users determine the true costs of maintaining the network, so they can decide whether using in-house staff or turning to an outside vendor makes economic sense.
- Make service and support more accessible. Many users are unaware of the service available to them. Still others believe that most service programs are geared toward ensuring rapid response.

Those who do so will see a return on investment in the form of loyal customers, add-on business and a willingness among customers to pay extra for premium service, the report said.

WE SHOW YOU HOW
COMMUNICATIONS NETWORK

NEW PRODUCTS

Modems/ Multiplexers

A multiplexing controller designed to simplify wiring between remote terminal clusters and Digital Equipment Corp. VAX and Microvax systems has been introduced by **Telebyte Technology, Inc.**

Model 572 allows as many as eight terminals or printers to communicate with the CPU over a single twisted-pair cable. In addition, the terminal cluster can be located as far as 5,000 ft from the CPU.

The Model 572 supports eight full-duplex terminals operating simultaneously at up to 19.2K bit/sec. Each of the eight ports also includes a full-duplex handshake link.

The controller is packaged on a DEC dual-PC board that installs in the CPU. A system, consisting of the Model 572 with ribbon cable and a composite-link cable bracket, costs $395.

Telebyte Technology, 270 E. Pulaski Road, Greenlawn, N.Y. 11740. 516-423-3232.

Raycom Systems, Inc. has added the **RS-422 Asynchronous I/O Module** to its 5100 series fiber-optic multiplexer product line.

Each RS-422 module provides 16 full-duplex channels, handles data rates to 19.2K bit/sec. and is configured with 16 sub-mini DB-25 connectors. The modules can be used with computer systems such as the Hewlett-Packard Co. HP 3000 and the IBM Series/1.

The RS-422 I/O Module costs $1,600.

Raycom Systems, 6395 Gunpark Drive, Boulder, Colo. 80301. 303-530-1620.

Diagnostic equipment

Verilink Corp. has unveiled an extended superframe channel service unit that features modem support, which allows the unit to automatically report alarm conditions to a remote network control center.

The **551VST L2** can report locally to a personal computer running Verilink's Verinet 2 transmission management software or to a Verilink extended superframe diagnostic system. Using an external 1,200 bit/sec. modem, it can report directly to Verinet 2.

The unit costs $3,250.

Verilink, 145 Baytech Drive, San Jose, Calif. 95134. 408-945-1199.

A mid-range protocol tester that supports color displays has been announced by **Atlantic Research Corp.**

The **Interview 6600** protocol tester can be used to monitor and emulate protocols for troubleshooting circuits at speeds up to 72K bit/sec. Features include an upgrade path to other Interview models, bar charts displaying critical relationships between events and IBM Color Graphics Adapter compatibility.

The Interview 6600 protocol tester costs $9,995.

Atlantic Research, 5390 Cherokee Ave., Alexandria, Va. 22312. 703-642-4000.

Cabling

A miniature Ethernet expander that provides an extended twisted-pair interconnection between the transceivers and controllers of any Ethernet local-area network has been introduced by **RAD Data Communications, Inc.**

The **LE-6** replaces AUI cable with two shielded twisted pairs, allowing Ethernet V1.0, V2.0 and IEEE 802.3 to run on a universal cabling system such as IBM's. Features include 10M bit/sec. transmission, SQE testing, AC/DC coupling, back-to-back frames and signal compatibility with all Ethernet standards.

The LE-6 extends the distance of data transmission between the controller and transceiver up to 820 ft.

A pair costs $445.

RAD Data Communications, 151 W. Passaic St., Rochelle Park, N.J. 07662. 201-587-8822.

TO COMMAND A WITHOUT BUILDING ONE.

When you want fuller control of your communications, the Ameritech Business Network can help. We've created a fiber optic based network with digital switching capability and the intelligence to adapt and respond to your commands.

Through our investments in state-of-the-art technology, we're prepared to meet your needs with a growing range of digital products that handle voice, data and video with amazing speed, volume and accuracy.

We're investing nearly $2 billion every year to expand one of the world's most advanced communications networks.

The Ameritech Bell companies of Illinois, Indiana, Michigan, Ohio and Wisconsin will work with you to tailor our network to your requirements. Our people are experienced in designing network systems that provide flexibility and choices.

We're committed to meeting your total communications needs, from service and products to technical support and competitive financing.

To put the Ameritech Business Network at your command, contact any of our Ameritech Bell companies.

Or phone us: 1 800 562-2444.

AMERITECH

Illinois Bell Indiana Bell Michigan Bell Ohio Bell
Wisconsin Bell Ameritech Applied Technologies
Ameritech Communications Ameritech Credit ADR
Ameritech Mobile Communications Ameritech Publishing Ameritech Services

©1988 Ameritech

Even if Bill's ditch digger doesn't get you, lightning will. Or ice storms. Or squirrels.

The fact is, you can't afford to expose your systems to erratic outside power.

Even a minor disturbance in power undermines your ability to provide systems availability. Sidelines your best people. And erodes management confidence.

Backhoe Bill Is About To Give Another Systems Group A Memorable Afternoon.

Enter Powerware™ Systems. Utterly reliable power solutions only from Exide Electronics. Cool, quiet, compact and cost-efficient. Configured for virtually all installations. Backed by the strongest customer support group in the industry.

And expressly designed to keep folks like Backhoe Bill out of your status reports.

Call 1-800-554-3448 for more information on Powerware™ Systems and the company that stands behind them. In North Carolina, please call 1-800-554-3449.

EXIDE ELECTRONICS Raleigh, North Carolina

SYSTEMS & PERIPHERALS

HARD TALK

Efrem Mallach

Chip's proof is in the pudding

A tremendous amount of attention has been focused recently on the poor performance of Sun Microsystems' Sun-4 reduced instruction set computing (RISC)-based workstation on the Neal Nelson & Associates commercial benchmark set. It's time to set the record straight.

Based on those benchmarks, *Computerworld* Senior Editor Stanley Gibson's recent column [CW, April 11] declared: "A bucket of cold water was dumped on a hyperventilating group of RISC enthusiasts." The results of these tests have been used to proclaim the unsuitability of the Sun-4 for commercial data processing (a correct conclusion), the unsuitability of the Sun Scalable Processor Architecture (Sparc) chip for commercial DP (not a reasonable conclusion from the results) and the unsuitability of RISC in general for commercial DP (totally absurd).

Suppose I wanted to design a boat with a newfangled diesel engine. I call up the diesel engine folks. They tell me they don't have any diesels in boats right now, but there's one on a dump truck a few miles up the coast that I am welcome to look at. I put the engine to my standard boat test and drive the dump truck off the end of the pier. It sinks like a rock. Conclusion: Diesel engines are no

Continued on page 48

'Unix University' relies on MVS

University of California at Berkeley, home of Unix version, is IBM shop

BY J. A. SAVAGE
CW STAFF

OAKLAND, Calif. — Despite a "great flurry of discussion" about the role of Unix in data processing for the nine-campus University of California at Berkeley, the institution's operating system remains IBM's MVS.

Unix "is not as sophisticated as MVS," said Jim Dolgonas, director of information and computer systems for the university. The University of California at Berkeley's Unix 4.2 "was developed because certain features were unavailable in AT&T's Unix. Now Unix has many of those features. But using [the operating system] is not like having vendor support.

"The IBM MVS environment is best suited for administrative computing — a high volume of reliable, secure processing needs," Dolgonas added.

Dolgonas's shop runs both MVS/XA and MVS/SP as well as VM/CMS. His shop also runs two Digital Equipment Corp. Microvaxes on VMS and Ultrix for communication protocol conversion.

A big adventure

While Dolgonas observes academic systems in each campus, his charge is to run all of their administrative processing along with that of the university's regents office. Additionally, he presides over one of 13 major computer centers for the university system. The centers are hooked up with what Dolgonas calls "a big SNA [IBM Systems Network Architecture] network."

His 1½-year-old IBM 3090 Model 180 mainframe batch processes payrolls for the university's 100,000 employees. In addition, the mainframe handles online transaction registration of the university's 130,000 students — who add and drop classes faster than you can say "surf's up." Other tasks include general ledger accounting, facilities management, keeping track of contracts and grants and personnel information.

Last month, the data center was moved from a small building next to the Berkeley campus, to a roomier area in neighboring Oakland. In Berkeley, Dolgonas had two rooms with a total of about 4,000 square feet packed with equipment. He now has room to stretch into a computer center three times that size.

He said the move went smoothly with "great cooperation from the vendors and suppliers." As many as six IBM support personnel were on hand to assist with the location change.

While the need for computing ability is constantly growing, the larger room and the shrinking

Continued on page 49

Masscomp revs up processors

BY STANLEY GIBSON
CW STAFF

BOSTON — Cutting response time to less than 1 msec in some applications, Massachusetts Computer Corp. (Masscomp) recently replaced its product line with four systems based on the Motorola, Inc. 68030 microprocessor.

The systems, like previous Masscomp processors, are intended to perform real-time acquisition, analysis and display of data. Masscomp computers are typically used in testing automobile, airplane and rocket engines; medical imaging; speech translation; and process control.

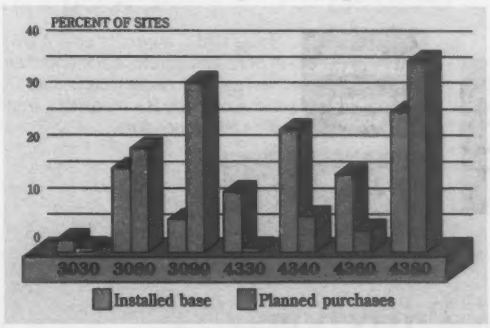
Masscomp said the submillisecond response time, which it claimed is a first for a Unix-based

Continued on page 50

Data View

IBM mainframe users move to 3090

Plan to purchase an increasing number of high-end machines



INFORMATION PROVIDED BY FOCUS RESEARCH SYSTEMS, INC.
CW CHART

Prime's 386-based EXLs pack 4 to 5 MIPS punch

BY NELL MARGOLIS
CW STAFF

NATICK, Mass. — Further straining the line between personal computers and minicomputers, Prime Computer, Inc. is planning a June shipment for two higher powered variants of its EXL 316 multiuser supermicrocomputer, which is based on the Intel Corp. 80386 microprocessor.

Like the EXL 316, the new EXL 320 and EXL 325 were built around Intel's 80386 chip and run in Unix, Microsoft Corp.'s MS-DOS and Pick Systems' Pick environments. Both, however, pack a greater wallop than the 3.2 million instructions

Continued on page 50

Inside

- Silicon Graphics rolls out low-priced Iris workstation. Page 48.
- Tandem aims dot matrix printer at shop floor applications. Page 49.
- Qume cuts prices on two laser printers. Page 51.

Intelligent
Another Alternative For IBM 3270 Users

IBM 319X COMPATIBLE WORKSTATIONS

- Fully compatible with IBM 3191 and IBM 3192 Workstations
- Built In Twisted Pair Connection (RJ-11)
- Bar Code Reader, Magnetic Strip Reader and Light Pen
- Built-in Printer Port for Local Screen Copy
- Ergonomic, compact with small footprint, tilt and swivel base

IIS offers a full range of 3191 and 3192 coax compatible Workstations with additional options and features.

Call today for more information

IIS INC. Intelligent THE ALTERNATIVE

For faster service, call 1-800-524-2837 or in New Jersey, call 201-343-8353

OFFER OF THE MONTH
IBM 3299 COMPATIBLE MULTIPLEXER
$399.

IIS INC., 92 Kansas Street, Hackensack, NJ 07601 Tel.: (201) 343-8353 Fax: (201) 343-8114 Tel.: (800) 524-2837

IBM® is a registered trademark of International Business Machines Corporation

Mallach

CONTINUED FROM PAGE 47

good for boats. Absurd? Of course. It's absurd because what I was testing — floatation — is unrelated to the engine. The dump truck sank because it was a dump truck, not because it had a diesel engine.

Distant relatives

Yet those who criticize RISC architecture or the Sparc chip on the basis of the Nelson benchmark results are falling into the same trap. The processor of a computer is like the engine of a boat or a dump truck. The benchmark tested primarily I/O capacity, not processing power, and the two are nearly unrelated.

What determines I/O capacity? The list begins with the design of the operating system and how it balances responsiveness with throughput, flexibility with optimization for a particular environment and ease of use with performance. It continues with the coding of device drivers and the sophistication of their access optimization algorithms.

I/O is further affected by the buses that connect the processor, the memory and the I/O subsystems. It includes the device controllers and their ability to operate independently of the processor and to overlap data transfers with other activities. Processor performance is down the list in about 12th place, just ahead of the phase of the moon and the color of paint on the computer room walls.

The logic content of channels, controllers, multiplexers and their cousins in a typical mainframe far exceeds that of the central processor. That's one reason why mainframes score poorly in "price per MIPS." Channels don't add millions of instructions per second, or MIPS. They just add throughput. What so-called experts sometimes forget is that users don't need MIPS, they need throughput.

A workstation like the Sun-4 was designed for a different environment. It was designed for users who perform enormous amounts of computing on relatively small quantities of data. Spending money on faster data transfer would be a poor decision on Sun's part. Sun knows what its customers need and has historically done a good job of providing it.

The Nelson benchmarks, then, test things that have little or nothing to do with the processor used in a system. When Gibson wrote, "It may be too early to tell if the test was a fair one for Sun's Sparc chip," he was missing the point. The test was neither fair nor unfair to the Sparc chip. It did not test the Sparc chip. The best reaction to it, in regards to Sparc's suitability for commercial applications, is a yawn.

This is not to criticize the Nelson folks. They knew what they were doing. They took a dump truck to see if it could float. It did, after a fashion. The problem is with the landlubbers who watched it from the dock and expected something magical to happen. There is no magic. To see if diesel engines are good in boats — they are, by the way — we have to put one in a boat. To see if the Sparc chip is good in commercial systems — and it might be — we have to put one in a commercial system. Until somebody does that, any statement is, at best, a guess.

Mallach teaches at the Boston College School of Management and is a consultant to user and vendor executives.

Low-priced RISC workstation bows

BY J. A. SAVAGE
CW STAFF

MOUNTAIN VIEW, Calif. — Hoping to reach a larger number of users, Silicon Graphics, Inc. recently announced a reduced instruction set computing (RISC), three-dimensional graphics workstation priced less than $50,000.

Silicon Graphics introduced the Iris 4D/50 Model for $49,500 as a precursor to a $15,000 entry-level graphics computer that the company said will be announced at the end of this year. The 4D/50 replaces the year-old $64,900 Iris 4D/60. The next most powerful model in Silicon Graphics' line, the 4D/70, also costs $64,900.

The 4D/50 is based on an 8-MHz RISC processor made by Sunnyvale, Calif.-based Mips Computer Systems, Inc. The CPU delivers 7 million instructions per second, according to Silicon Graphics. The firm's other systems are based on Motorola, Inc.'s 68000 series chips.

"Silicon Graphics wants to get a bigger piece of the market pie and do what Sun [Microsystems, Inc.] did by getting into the mass market," said Vicki Brown, a workstation analyst at International Data Corp. in Framingham, Mass.

"The risk is they are getting into the mass market too late," Brown said, adding that Silicon Graphics will have a good chance of success against better established low-end competitors because the company's products offer superior performance.

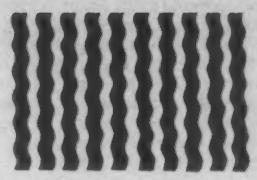
Silicon Graphics' move to offer less expensive systems follows earlier statements that the company would offer high-end systems to compete with the graphics superworkstations of Stellar Computer, Inc. and Ardent Computer Corp.

The Iris 4D/50 basic configuration includes 8M bytes of main memory, an eight-bit color plane, a 170M-byte disk drive, Ethernet, a keyboard, a mouse and a 19-in. color monitor. The machine can be upgraded to a 4D/70 CPU for $15,000, according to the company.

VaporCASE

VaporCASE

The wishful promises of vendors who are trying to jump on the CASE bandwagon. They demonstrate part of the CASE solution, and hope you'll wait until they develop the rest of their system which they promise will be ready "any day now." Meanwhile, even if they could help you develop a brilliant applications strategy, you have no clear way to implement it.



Piece Parts

Some CASE suppliers offer a small piece or two of the puzzle. A front-end here. A back-end there. Integration? No problem! Just as soon as they can make Company A's front-end work with Company B's repository, and tie everything into Company C's code generators.

Projections

One way to evaluate a CASE system is to simply visit the installations where the product is up and running. Most CASE vendors will tell you where their product might be installed in the future...if you don't mind waiting.

University

CONTINUED FROM PAGE 47

footprint of the machines may make this the system's final move. "Over time, we won't ever need to expand the computer room," Dolgonas said, crossing his fingers.

Shrinking direct-access storage devices (DASD) offered Dolgonas an immediate gain in floor space. With the new building came 10 IBM 3380 Model J DASDs.

These replaced "a sea" of Control Data Corp. 3350s, "with a tremendous savings in floor space," Dolgonas said.

On the microcomputing front, Dolgonas is cheering the proliferation of desktop terminals, but only if they are dumb terminals, IBM Personal Computers or IBM PC clones.

He estimates there are 700 to 800 terminals for the statewide, 100,000-person staff, including everyone from maintenance workers to analysts. Dolgonas estimates that half of those terminals are personal computers used primarily by analysts.

IBM PCs preferred

"We encourage users to get PCs [IBM PCs or clones] rather than Apple Macintoshes. We set up training and give them advice," Dolgonas said.

Now that the move is over and the dust is settling, Dolgonas has embarked on a dozen new projects, including putting the university's retirement system information on a data base so that pension information will no longer be calculated by hand and entering the personnel policies of the 20 unions that work at the university on a data base.

"We let the users decide what projects we're going to work on, and they ask us for recommendations as to the timeliness or sequence of the projects," Dolgonas said.

The projects are then sent to a steering committee with representatives from the university president's office, treasury and legal departments.

"Right now, all our enhancements are oriented toward two goals: on-line transactions and the ability to interface," Dolgonas said.

Tandem offers printer family

BY J. A. SAVAGE
CW STAFF

CUPERTINO, Calif. — Tandem Computers, Inc. recently unveiled a low-end, 14,000 page a month dot matrix printer aimed for distributed applications on the shop floor or in the office.

In addition to sharing a control language with other Tandem peripherals allowing users to run applications for any printer in the Tandem family, the 5512 printer has a paper tractor that the vendor claims can reduce waste by advancing paper or invoices automatically.

The printer is for use with Tandem's Nonstop on-line transaction processing (OLTP) computers using Tandem's Guardian 90 operating system or with its LXN OLTP computers using a Unix operating system. It can be connected to a host computer and can run in a local-area network, according to Rich Ghiossi, printer product manager at Tandem.

The 5512 prints 160 char./sec. in letter quality mode and 400 char./sec. in draft mode. The high-speed draft rate is 480 char./sec.

The printer's graphics resolution is up to 360 by 360 dot/in. It offers two fonts, Gothic and Courier, and costs $3,495.

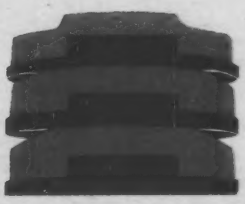
The three other printers in the same Tandem line range from the 5515 model, which can perform 50,000 pages a month at a price of $6,450, to the 5518, capable of 350,000 pages a month and priced at $32,000. In between those models, the 5516 handles 100,000 pages a month at a price of $11,950.

The 5512 has two paper handling modes, a continuous form load and unload, which performs automatic paper alignment, and a demand-document feature that allows a page to be removed without advancing an additional form. According to Ghiossi, the feature is not available on Tandem's other printers.

Three interfaces are supported by the printer: RS-232C, current loop and a Centronics Data Computer Corp. parallel interface.

S PACBASE™

CASE Software



PACBASE is the completely proven, totally integrated, full life cycle CASE system that addresses the strategic concerns of MIS Directors. It speeds applications analysis and design, and eliminates the delays and the expense of applications maintenance... all helping to increase the MIS response for key business applications. No vague promises. No smoke. Just the reality of the proven CASE solution.

Architecture

PACBASE is the standard for the full life cycle CASE solution. It is a seamless integration of methodology independent analysis, prototyping and programming facilities with an active enterprise dictionary and automated generators. PACBASE produces complete COBOL programs, database descriptions, screen maps, integrated on-line help and documentation directly from design specifications. All portable across a wide variety of hardware, operating environments and DBMS', (including DB2)...IBM, Honeywell and UNISYS. All automatically maintainable at the specifications level. MIS Directors who understand the CASE problem recognize PACBASE as the total CASE solution.

Installations

There are over 500 PACBASE installations worldwide serviced and supported by a staff of over 1400 CGI professionals. Closer to home, there are nearly 100 installations in the U.S. that you can see today. So instead of listening to someone else's projections, visit one of our installations. Why wait any longer for the bits and pieces to come together. Call CGI Systems today for complete information about PACBASE... the complete CASE solution:

1-800-PAC-1866

PACBASE: Seeing is Believing

Show Me!

For a live PACBASE Executive Presentation that blows away all the vaporCASE, simply write PACBASE on your business card, send it to our Marketing Dept., and we'll contact you to arrange a date that's convenient for you.

cgi

CGI Systems, Inc.
One Blue Hill Plaza, P. O. Box 1645
Pearl River, NY 10965 (914) 735-5030

If you market to cities, towns, counties or school districts, you'll find the decision-makers at this show!

1988 Massachusetts School-Municipal Data Processing Expo

Friday, June 10, 1988
Best Western Royal Plaza Hotel
Marlboro, Massachusetts

For more information and our kit, please call Ed Sterling, Exhibit Director, 617-426-7272

Produced in cooperation with the MMA Consulting Group

Masscomp

CONTINUED FROM PAGE 47

real-time system, spans the receipt of an external interrupt through the execution of a high-level user process.

The new models, dubbed the MC6300, MC6400, MC6600 and MC6700, come in configurations ranging from a seven-slot pedestal to a 30-slot cabinet. The systems run Masscomp's real-time Unix operating system, RTU.

The MC6300 is a seven-slot pedestal system, configured with one or two 25-MHz 68030 microprocessors that share a 64K-byte direct-mapped physical cache. The system is available with one or two Motorola 68882 floating-point coprocessors and one or two Masscomp Super Lightning floating-point accelerators.

The system also comes with 8M bytes of parity memory, a small computer systems interface (SCSI), an Ethernet controller and four RS-232C serial communications ports.

The system features add-on error-checking and correcting memory to support up to 120M bytes of system memory, a 14 million floating-point operations per second (MFLOPS) vector accelerator, one or two graphics subsystems and Masscomp's STD+ Bus data-acquisition system.

Storage subsystems include a 150M-byte cartridge tape, a ½-in. reel tape drive and two enhanced small device interface disk drives, each of which has 318M bytes of capacity. MC6300 pricing begins at $24,900.

The MC6400 system comes in a rack-mount configuration with six slots. Like the MC6300, it also supports two CPUs with shared cache and has two floating-point coprocessors, two optional floating-point coprocessors, parity memory, an SCSI interface, an Ethernet controller and serial communications ports, all on a single board. Prices for the MC6400 start at $28,900.

Available either in pedestal or rack-mount configurations, the MC6600 offers 15 slots and can contain up to three 68030-based CPUs. The system supports one 14-MFLOPS vector accelerator per CPU.

Up to 120M bytes of error-checking and correcting system memory is available for the MC6600 in 8M- and 16M-byte increments. The system reportedly can support up to 568M bytes of disk, cartridge or reel tape. Prices for the MC6600 range from $42,500 to $77,900.

The high-end member of the family, the MC6700, is packaged in a 30-slot enclosure and can contain up to five 68030-based CPUs, each with 64K bytes of cache, a 68882 floating-point coprocessor and an optional Super Lightning floating-point accelerator.

The MC6700 performs up to 56 MFLOPS using four vector accelerators and supports up to four Intel Corp. Multibus I/O subsystems, two VMEbus I/O subsystems and two STD+ Bus data acquisition subsystems. Pricing ranges from $59,000 to $120,000.

The Super Lightning floating-point accelerator is a very large-scale integration chip set consisting of a proprietary floating-point interconnect chip and a Weitek Corp. 3164 computational chip.

Integrated on the Masscomp 6000 family of CPU boards, the chip set performs more than 7 Whetstone MIPS, according to the vendor. The chip set is priced at $3,000.

All models in the MC6000 series wil be available in 60 days, except the MC6400, which will be available this fall.

Prime's EXLs

CONTINUED FROM PAGE 47

per second (MIPS) performance of the EXL 316, according to Prime.

The EXL 320, using the 20-MHz 80386 chip, will deliver 4 MIPS to as many as 48 users working on typical Unix applications, a Prime spokesman said.

The 5-MIPS EXL 325 relies on a 25-MHz Intel Corp. chip to better the EXL 316's performance by 56%, according to the company.

"Prime's latest EXL models are right in line with an industry trend to keep pushing the performance of 386-based platforms while keeping prices at a personal point," said Bruce Jenkins, vice-president of Daratech, Inc., a market research firm in Cambridge, Mass.

EXL 320 pricing starts at $25,900, with maintenance from $137 a month; the EXL 325 is priced from $45,900, with maintenance from $174 a month.

The move, Jenkins said, is a smart one on Prime's part. "As soon as there's adequate hardware performance to run an application, someone's going to move that application to the machine in question," he said. "PC users tend to be less finicky about the technical fine points of how the power got into the box. PC CAD [computer-aided design] users will just want to know, can the box do the job?"

In addition to the new EXL models, Prime announced software based on IBM's Systems Network Architecture (SNA) that provides communication links between the EXL series and IBM systems using IBM 3270 applications. The software is available immediately.

The EXL family can also communicate with Prime 50 series minicomputers, IBM Personal Computers and compatibles and other third-party systems across Ethernet cabling running Transmission Control Protocol/Internet Protocol software, SNA and Prime proprietary communications tools.

IBM without CCA.

If you want high performance from your IBM© mainframe, you can't get it from IBM alone. The only route to true high performance is Model 204 DBMS software from Computer Corporation of America.

From the 3090 to the 9370 and across all operating systems, Model 204 will make your application run faster now. CCA software combines power and flexibility to handle large databases and complex applications. And it helps you handle the biggest business challenge of all - the future.

We've been dedicated to one thing for over 20 years: building high-performance software. We never stop working to make our products run faster and better. Today, they outperform everything else.

Remember, no matter what your mainframe looks like: without CCA, high performance is just an empty promise.

IBM is a registered trademark of IBM Corporation.

NEW PRODUCTS

Processors

A family of real-time image processing boards for use with its Series 150/151 product line has been announced by **Imaging Technology, Inc.**

The **RTMP-150/151** real-time modular processor consists of a motherboard with up to three position-independent plug-on computational modules. According to the vendor, each module performs an image processing function that previously required up to three boards to perform. The processor is compatible with the Series 150 family of Motorola, Inc. VMEbus boards and the Series 151 image processor.

Four computation modules are available for performing real-time operations, binary correlations, rank value filtering and look-up tables.

The RTMP-150/151 real-time modular processor costs $995. The computational modules cost from 1,295 to $5,495.

Imaging Technology, 600 W. Cummings Park, Woburn, Mass. 01801. 617-938-8444.

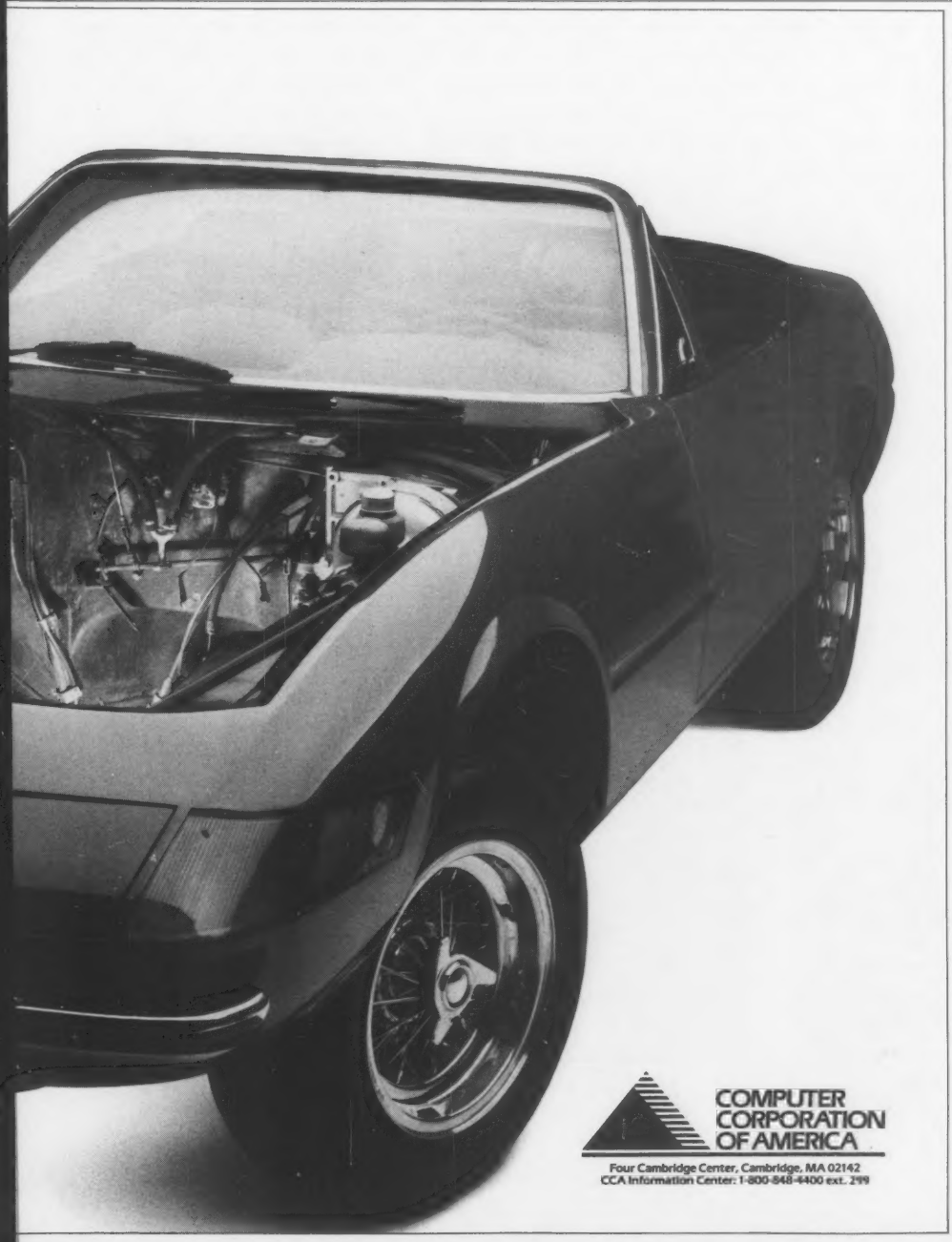
An integrated vector/scalar processor for its I/O Computer has been announced by **Aptec Computer Systems, Inc.**

The I/O Computer feeds data to array processors and other high-speed devices at data rates up to 12M byte/sec. The **VSP-1** processor plugs directly into the I/O Computer's internal bus, performing signal-processing algorithms.

The VSP-1 contains a scalar processor and a 20 million floating point operations per second vector processor, both of which share 1M byte of static memory on an 80M byte/sec. bus.

A single VSP-1 costs $24,900. An IOC/VSP-1 system, including an I/O Computer-24, a VSP-1, 16M bytes of memory and development tools, costs $99,500.

Aptec Computer, 9605 S.W. Nimbus Ave., Beaverton, Ore. 97005. 503-626-9000.



Graphics systems

An electronic slide presentation system said to allow users to create and display images in true-color on a large-format or red-green-blue monitor has been announced by **Autographix, Inc.** and **Compugraphic Corp.**

The **Electronic Slide Presenter**, or ESP, offers 680- and 1,024-line resolution capabilities and a 16-million-color palette. A pop-up picture directory lets users preview the presentation by showing nine thumbnail images at a single view. Other features include a screenwriter and a remote-control device.

The hardware components include an Intel Corp. 80286-based computer, a menu-display monitor and a graphics controller.

ESP is priced at $19,900 for a typically configured system.

Autographix, P.O. Box 9031, Waltham, Mass. 02154. 617-890-8558.

Printers/Plotters

Office Automation Systems, Inc. has updated its line of laser printers and controllers.

The **Laserpro Express** now comes standard with 512K bytes of random-access memory and six emulations, including Epson America, Inc.'s FX-80, IBM's Proprinter, NEC Corp.'s Spinwriter and Qume Corp.'s Sprint. It costs $1,995.

The **Laserpro Series II Express** now comes with 1M byte of RAM and includes Hewlett-Packard Co. Laserjet Plus emulation in addition to the emulations of the Laserpro Express. It is priced at $2,495.

Office Automation Systems, 9940 Barnes Canyon Road, San Diego, Calif. 92121. 619-452-9400.

Qume Corp. has reduced the prices on its **Qume Scripten** and **Qume Laserten Plus** laser pritners.

The Scripten, featuring Adobe Systems, Inc. Postscript compatibility, desktop publishing capabilities and a resolution of 300 dot/in., has been reduced to $4,995. Additional features include 3M bytes of memory, 11 type families and 35 resident fonts.

The Laserten Plus includes an interface module said to provide compatibility with most computers, word processing applications and word processing systems. It offers resolution from 75 to 300 dot/in. It now costs $2,795.

Qume, 500 Yosemite Drive, Milpitas, Calif. 95035. 408-942-4000.

Auxiliary equipment

AST Research, Inc. recently introduced the **AST 5250 Splice Box**, which it said allows IBM System/34, 36 and 38 users to substitute twisted-pair for twinaxial cable.

By using the twinaxial ports or RJ11 ports on each side of the splice box and cabling through, up to seven devices can be accommodated. The splice boxes reportedly will be included in all AST 5251/11 product packaging, the AST 5250 workstation and the AST 5250 personal computer.

The AST 5250 Splice Box will be available to end users as a separate product at a cost of $100.

AST Research, 2121 Alton Ave., Irvine, Calif., 92714. 714-651-8489.

Why Businessland Keeps Networking Itself.

As one of the world's leaders in PC connectivity, it's hardly surprising that Businessland® is itself one of the most heavily networked organizations in the world.

In fact, Businessland operates its own business through over 130 connected LANs, integrating components from dozens of different hardware and software manufacturers. Connecting micros to minis and mainframes located throughout the United States and England.

So, we don't just know how to network. We also know how connectivity impacts a business environment. How electronic mail not only improves communication and reduces "meeting" times, but how it opens up entirely new and more productive ways to work.

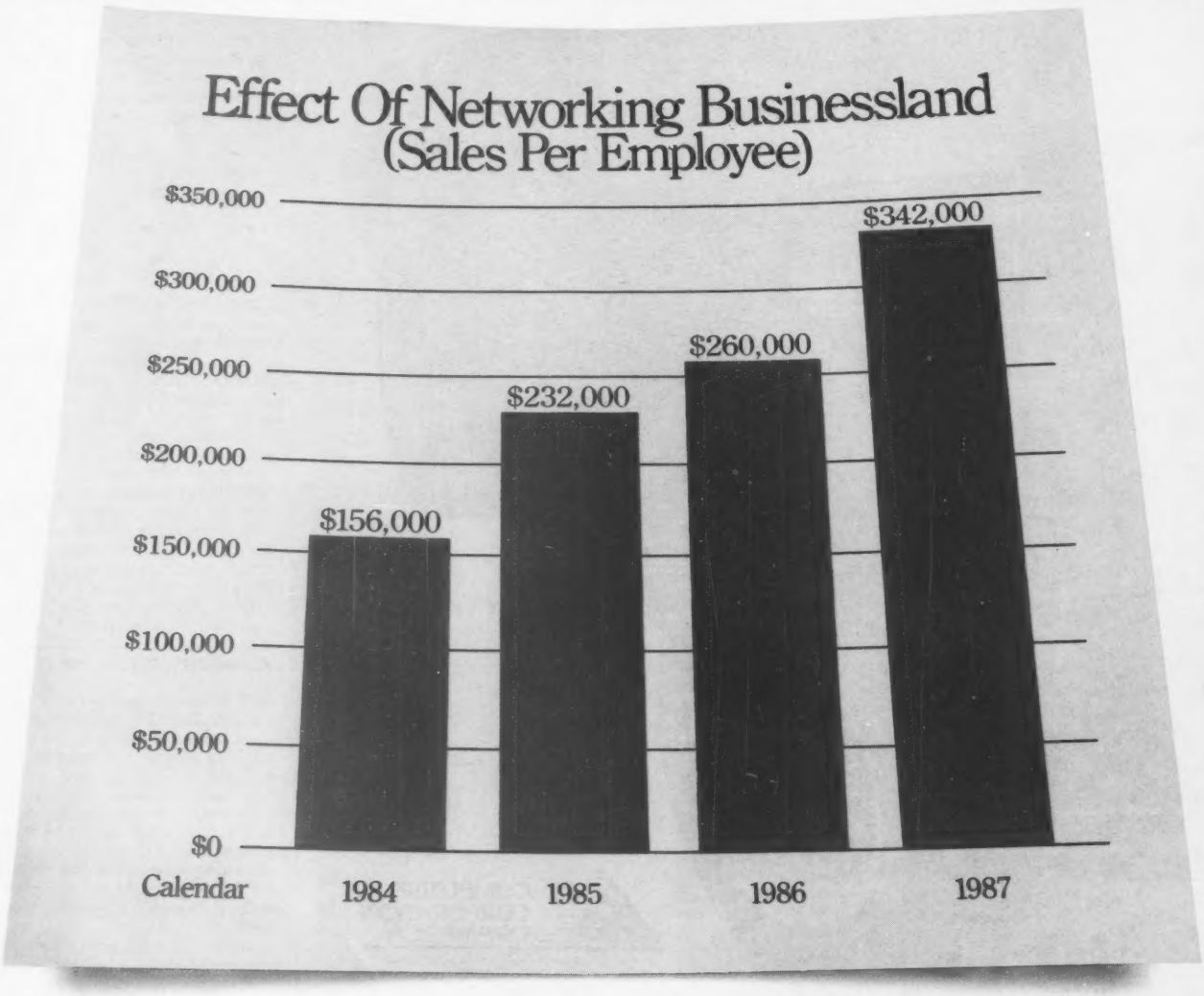
And how sharing resources can reduce expenses and support staff.

The proof? At Businessland, the sales per employee has more than doubled in four years. In fact, our productivity has increased over 40% last year alone.

So if you'd like to learn more about networking from someone who really understands it, just give us a call at 1-800-328-8383 for the Businessland Center nearest you.

BUSINESSLAND®

A Different Kind of Computer Company



Businessland and the Businessland logo are registered trademarks of Businessland Inc.

Users say EDI cuts inventory costs, speeds product delivery

BY LAWRENCE STEVENS

Rick Wakeland discovered electronic data interchange (EDI) in 1985 while he was trying to invent it.

"We didn't know anything about standards or EDI vendors," says Wakeland, manager of purchasing operations at PMI Food Equipment Group, a Troy, Ohio-based large manufacturer of equipment for the food industry. "All we knew was that it was strange that we would generate a purchase order using our software, print it and mail it to our supplier, who would then have to enter it into his computer."

While trying to plan his own communications system, Wakeland was tipped off to EDI standards and the EDI third-party market by one of his suppliers, Joseph T. Ryerson & Son, Inc. in Chicago, a steel distributor that had used EDI to facilitate sales to Ford Motor Co. and General Motors Corp.

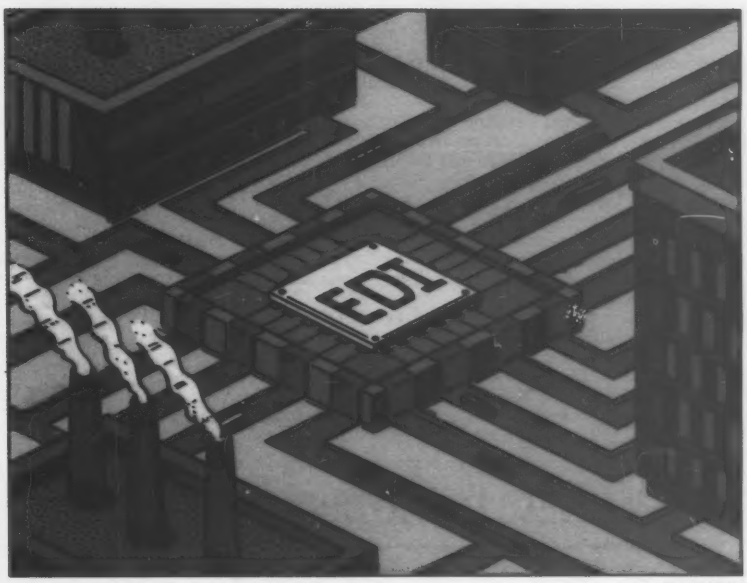
Using Tracs, EDI software from Sterling Software, Inc. formatted to the ANSI X12 standard, PMI and Ryerson developed a pilot project in which 200 to 300 purchase orders were transmitted per month.

"We figured that preparing and sending a paper purchase order cost us about $25," Wakeland says. "With EDI, it costs about $5." The savings on that pilot project came to more than $60,000 annually.

Today, PMI, one of Premark International, Inc.'s four product groups, uses EDI to transmit 18,000 purchase orders annually to 13 suppliers. Even though that number represents only 15% of the company's total purchase order volume, Wakeland estimates that his firm is saving more than $360,000 a year.

EDI saves money and time by enabling purchase orders, invoices, bills of lading and the like to be electronically transmitted.

Stevens is a free-lance writer based in Springfield, Mass.



BRAD HAMANN

INSIDE

IBM's Information Network puts teeth in EDI commitment
Page 54

Third-party firms provide around-the-clock communications
Page 55

Banks worry that they'll lose valuable float in funds transfer
Page 58

It eliminates the printing and handling of paper at one end and the inputting of data at the other.

First implemented more than a decade ago by the trucking industry, EDI was eventually picked up as an efficiency measure by vertical markets, such as the automotive, textile and apparel industries, under pressure from foreign competition.

But today, no market is unaffected by it. Victor Wheatman, manager of EDI planning and services at Mountain View, Calif.-based Input, a market research and management consulting firm, estimates that 1987 EDI revenue reached between $70 million and $90 million. And, he says, he sees an average annual growth of 88% until 1992 (see chart page 54).

Electronic staff

The most obvious and measurable advantage of EDI is that it saves money. "It's very expensive to hire people to do the redundant input that telephone and letter communications require," says George Klima, director of accounting systems and procedures at Super Valu Stores, Inc., a Minneapolis food wholesaler. Klima estimates that in invoicing alone, eliminating matching invoices and remittances and other clerical functions saves his company more than $600,000 annually.

Many companies find they are saving money not only by cutting staff but also by being able to better organize the workday. Jim Bridges, vice-president of MIS at United Refrigerated Services, Inc. in Atlanta, says he finds that receiving invoices and purchase orders in real-time eliminates the peaks and valleys that result from companies sending documents daily or weekly.

"With EDI, we don't have the

EDI

FROM PRECEDING PAGE

panic afternoons when the mail room drops a ton of release orders on us at four o'clock and suddenly everyone is working time and a half," Bridges says. "We get orders in all day, and we can pace ourselves."

Staying efficient

Many users point to EDI advantages that are not directly related to postage and handling of paper documents.

For example, what Bridges says he likes most about EDI is that it cuts down on the inevitable errors that occur when data is entered and printed out so many times. United Refrigerated is a public warehouse for the grocery industry. It receives more than 1,000 release orders a day to ship products to outlets throughout the country. That leaves a lot of room for error, and, as Bridges says, "when we make a mistake, we pay freight both ways: We have to restock the product, but most importantly, we lose some goodwill."

While Bridges does not have an exact figure on how less often errors occur now that his company uses EDI, he says that the 850 release orders his firm receives electronically each day are processed practically error-free.

When used for transmitting price lists and promotional announcements, EDI can also better organize the buying process. "When we had to depend on salespeople to deliver price lists and promotional announcements," says Dave Toebbe, systems specialist at The Kroger Co. in Cincinnati, "we were never sure of getting current information. We would miss some promotions because a salesperson couldn't get in on time."

The ability to immediately receive and act on purchase orders and invoices provides a level of service that non-EDI users will be unable to compete with.

PMI's Wakeland

Bruce Bennett, data processing manager at Eber International, an apparel company in San Francisco, says that when his company first tested EDI with Mervin Kurtzman, Inc., a Los Angeles men's clothing store, 10 months ago, he knew it would be quicker than regular mail, but he was surprised at how much quicker.

Eber's first EDI transmissions were done in tandem with paper. "It was a week after I received my first EDI purchase order that I saw the paper version of that order," Bennett recounts. "The customer may have received the shipment before then. Suddenly, our level of service to Mervin's increased significantly."

Real-time transmission of purchase orders also allows companies to lower their inventories, since they will be able to replace stock more quickly. Gary Sweetapple, senior director of corporate system development at K Mart Corp. in Troy, Mich., says that now that his company is handling 80% of its general merchandise orders through EDI, he is able to delay ordering most stock by three to four days.

"When you multiply three days by our entire stock, the cost savings in interest is substantial," Sweetapple says.

Hourly inventory

Lowering inventory by three or four days is an impressive savings for retailers, but manufacturers plagued by tough foreign competition often have to do even better. Each of the big three U.S. auto makers has instituted some form of just-in-time (JIT) inventory, which requires, in some cases, only an hour's supply. According to Charles Richards, system development supervisor of the purchasing and supply staff at Ford in Dearborn, Mich., JIT is impossible without EDI.

"We have to schedule our assembly plants and docks hour by hour," he points out. "You can't do that with paper, since its timing is too inexact. You never know when the paper will arrive." Ford uses EDI to send purchase orders and receive information as to when parts will arrive, both for production and nonproduction items such as machine parts.

While JIT is considered the leading edge in plant organization, Richards says he sees EDI as a technology whose ramifications have not yet been fully explored.

He says he feels that once the age of paperless business transactions is reached, industries will be able to explore efficiencies and techniques of which JIT will be only one example.

"I compare EDI to a superhighway system," Richards explains. "By itself, it has little meaning. But it has made a lot of things possible. I expect that in the future, we will depend on EDI as much as we depend on our highway system today."

Electronic funds transfer

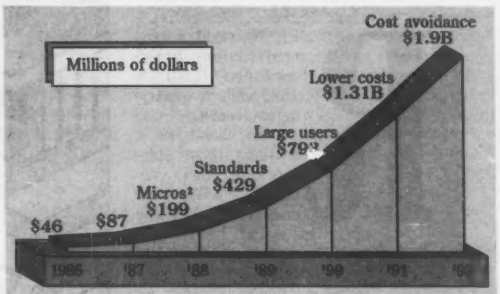
Many experts say that aside from JIT, the most revolutionary change EDI will bring in the near future will be cash management. Some companies are already taking into account the more exact knowledge of when cash will arrive and the quicker and more accurate collection procedures afforded by EDI.

Better cash management has

Continued on page 56

Exponential U.S. EDI market growth

A $1.9 billion market by 1992[1]



[1] Includes network and processing services, software and professional services

[2] Various factors will contribute to EDI's growth at different times, including the acceptance of microcomputers and standards, large companies requiring suppliers to use EDI, lowering of communications costs and the need to cut costs in general

INFORMATION PROVIDED BY INPUT
CW CHART

IBM: Late to the beach but a pretty big splash

BY PATRICIA KEEFE

IBM has caught the fever, if not the wave, of electronic data interchange (EDI). This is one surfin' safari the computer giant appears determined to lead, even at the cost of supporting open systems.

Under the sunny skies of Tampa, Fla., in the midst of a small office park beats the heart of IBM's EDI commitment — its worldwide, value-added Information Network.

In the U.S., the Information Network ties together 20 primary-node cities, 226 dial-in locations and three operations centers. International support is extended to 16 countries via IBM's Systems Network Architecture (SNA) and another 36 via CCITT X.25.

This modern operations center is the most overt example of IBM's newly charged commitment to EDI. More subtle is the computing giant's embrace of the interorganizational system concept, defined as any network or networks shared by two or more companies.

Putting teeth in IBM's commitment is the recognition that "we have to support the business patterns of our customers — regardless of equipment type," says Michael Ribet, the Information Network's manager of interorganizational systems/EDI marketing. He notes it would be unrealistic to expect users of IBM's EDI Services to communicate with only those trading partners that use IBM systems.

Given the wisdom of the adage, "Whoever owns the network controls the account," it is not hard to see why IBM views control of the interorganizational system as paramount. Such a system clearly increases the potential number of accounts to be won. And EDI is perhaps the most prominent example of an interorganizational system.

"By the end of the century, doing business without EDI may well be like trying to do business today without a telephone," IBM marketing literature optimistically predicts.

Advantages of the newcomer

Nevertheless, IBM's zest for EDI is relatively new. Launched in 1979, the SNA-based Information Network was initially targeted at IBM's 2,000 largest suppliers — 80% of its production — and 37 plants worldwide, including the Communications Products Division.

Announced in 1985, EDI Services, an offering under Information Network, came relatively late to the commercial market, claims Eric Arnum, editor of "EMMS," a New Canaan, Conn.-based newsletter that covers the electronic mail industry.

Such foot-dragging has effectively shut IBM out of some markets that have already standardized on one system, Arnum adds. For example, Sterling Software, Inc. can claim the lion's share of the pharmaceutical EDI segment.

Not too shy

Yet IBM is no EDI wallflower. It boasts a competitive toehold in the insurance market as the value-added network provider at the hub of the Insurance Value-Added Network Services consortium's EDI system. IBM's customer list also includes Texas Instruments, Inc., Pennzoil Co., Marshall Industries and San Francisco's Federal Home Loan Bank.

And lagging behind leading EDI innovators, such as the automobile, grocery and airline industries, are scores of other businesses waiting to be plundered.

"IBM obviously has an enormous advantage over any other company on the planet when it comes to computer, semiconductor and office equipment and telecom gear suppliers," Arnum says, noting that these industries have been surprisingly slow to implement EDI.

Moreover, there is something to be said for arriving fashionably late in a new market — IBM's standard modus operandi. In this case, the company's tardiness has allowed it to wait out the standards controversy.

IBM's EDI strategy breaks down in the following ways:

- Develop specific industry interorganizational system solutions and alliances to increase marketplace participation and develop significant presence in key industries. One example of this is IBM's connection with The Corporate Alliance, an association of companies that provides goods and services to hospitals.
- Capitalize on host attachment strengths and E-mail to drive EDI.
- Elevate interorganizational system awareness.
- Facilitate electronic handshaking within 24 hours of initiation.

EDI Services reportedly enables computers to transmit formatted messages into an E-mail box attached to Information Network for retrieval by authorized recipients. Users maintain a single connection to Information Network, regardless of the number of trading partners. This saves the expense and support associated with multiple point-to-point connections, IBM claims. •

Keefe is a *Computerworld* senior editor, networking.

Will users welcome third-party vendors?

In chaotic world of EDI, they provide extras, 24-hour assistance, help with standards

BY JUDITH FEDER

If you're wary about setting up electronic data interchange (EDI) in your MIS shop, there are plenty of EDI service vendors out there that can do it for you.

And judging by the entrance of new players into the marketplace, the role of third-party service providers in connecting customers and their trading partners in EDI relationships has become more important than ever to MIS managers.

In recent months, Western Union Corp., U.S. Sprint Communications Co./Telenet Communications Corp. and Compuserve, Inc. have joined McDonnell Douglas EDI Systems Co., GE Information Services, Sterling Software, Inc's Ordernet Services Division and others as third-party vendors of EDI services.

In addition, banks are exploring their potential role in EDI (see story page 58).

Third-party advantage

Why do certain corporations choose to use EDI third-party services rather than linking directly with their trading partners?

According to Lee Foote, EDI manager of Du Pont Co.'s Information Systems Department and chairman of the Chemical Industry Data Exchange Committee, it is because these services offer communications capability operating around the clock, which is crucial to many companies.

"That's what a third-party provider can do better than an individual player," Foote says. High network performance standards are also among the benefits users see in third-party networking.

In addition, both new and veteran third-party players are stressing a full-service approach to EDI that goes beyond providing network capacity. These companies enrich their EDI offerings with services such as translation capabilities, electronic mail, third-party network interconnections, training, hard-copy delivery options and data base access.

Vendors also help sell the EDI concept to trading partners that may be resistant to or simply ignorant about what EDI can offer. One major vendor is reported to spend up to 40 hours converting each trading partner of its EDI customers.

Seeing clear

Perhaps the most important element, users look to third-party vendors to establish order in what one MIS executive recently described as the "rat's nest" that is EDI.

Competing standards are what continue to characterize the overall EDI environment, largely because of adherence to incompatible data formats. Public standards such as ANSI X12, industry standards such as Ordernet for the pharmaceutical market and private or proprietary standards — including those developed by many mass merchandisers — continue to be used today.

Therefore, users requiring translation between incompatible EDI formats look to third-party vendors to provide or recommend translation software that resides on customer computers or to perform "in-network" translation.

THIRD-PARTY emphasis on full service is a virtual necessity, simply to meet the varied needs of today's EDI community.

Third-party emphasis on full service is, thus, a virtual necessity, simply to meet the varied needs of today's EDI community. E-mail, for example, is a value-added service that has assumed greater importance in the EDI market, especially as EDI customers seek nonstructured electronic links with their trading partners and E-mail customers become interested in using EDI.

That is why Control Data Corp.'s Redinet is now bundling Redi-Mail E-mail software into its micro-based turnkey EDI package. The three new players in the field, Western Union, Compuserve and U.S. Sprint/Telenet Communications, are leveraging their experience as E-mail providers to bring both current and new customers into the EDI fold.

Leading contenders

GE Information Services, Ordernet and McDonnell Douglas hold the top three spots in EDI revenue and market share (see chart above).

McDonnell Douglas adheres to its strategy of generating revenue primarily from network traffic; the company certifies translation software that customers install on their own machines.

GE Information Services, a division of General Electric Co., takes a more full-service approach, stressing in-network translation and mailbox capabilities.

Ordernet is perhaps most closely identified with the successful pursuit of vertical industries — pharmaceuticals, hardware and household product manufacturers.

Seeking to bridge the gap between themselves and the market leaders, several third-party vendors are raising their EDI profiles.

Undoubtedly the most formidable is IBM's Information Network, which the company says can woo users with its Systems Network Architecture (see story page 54).

CDC's Redinet, which is bringing a number of EDI pilots into full-scale implementation this year, has added value to its network through a range of new services while maintaining its reputation as a low-cost provider.

Everyone's a prospect

Among the new players, Compuserve is aggressively pursuing the EDI business of its current customers — and its customers' customers.

Elizabeth Sibbring, marketing manager of Compuserve's EDI, says, "We look at all trading partners as Compuserve prospects and EDI as just one of several services we can offer customers."

Western Union has adopted a similar stance, positioning EDI as one of a growing number of options on its Easylink E-mail network.

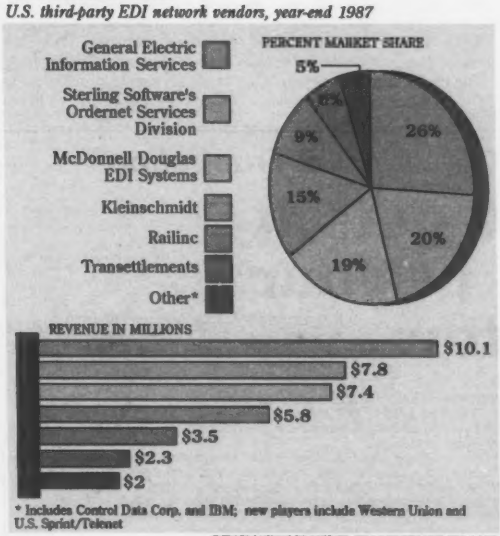
U.S. Sprint/Telenet jumped into the middle of the EDI market through resale agreements with Ordernet and Transettlements, Inc. and can now count Digital Equipment Corp., Tandem Computers, Inc. and Ball Corp. among its base of customers.

U.S. Sprint/Telenet's approach to EDI is in keeping with its emphasis on providing a full range of network services via the acquisition of a range of applications capabilities. •

Feder is a free-lance writer and consultant at Link Resources Corp. in New York.

The middlemen

U.S. third-party EDI network vendors, year-end 1987



* Includes Control Data Corp. and IBM; new players include Western Union and U.S. Sprint/Telenet

INFORMATION PROVIDED BY LINK RESOURCES CORP.
CW CHART

Getting started

Experts advise that the first step to adopting electronic data interchange (EDI) is to develop an implementation plan. This plan should include the following tasks:

- ✔ A cost/benefit analysis as to whether translation software should be licensed or written in-house.
- ✔ A study of the company's existing paper flow and how it can be improved.
- ✔ A determination of which departments could benefit from EDI.
- ✔ Decisions about which trading partners should participate — usually starting with the largest ones.
- ✔ A timetable for full implementation.

Second, hardware communications protocol requirements have to be considered. This involves studying distance of transmission, delivery time frame, volume of transactions, number of trading partners and security issues. Next, software requirements must be determined.

Finally, there should be face-to-face meetings with trading partners to hammer out issues of security, format and organizational matters, such as who initiates the call and how often transmissions will be sent.

LAWRENCE STEVENS

Looking for used equipment?

Get *used* to finding what you want — and saving time — with MARKETPLACE.

COMPUTERWORLD
MARKETPLACE

Shop for the products and services you need. Every week.

EDI

FROM PAGE 54

resulted in organizations receiving discounts and better terms by making more timely payments. But this revolution in cash management will be more dramatic with the increased use of electronic funds transfer, a type of EDI in which payments are electronically transferred from the purchaser's to the vendor's account.

Currently, the largest electronic funds transfer project has been undertaken by GM and a number of its vendors. James J. Hopes, vice-president of Chase Manhattan Bank NA in New York, is involved with the GM project.

That extra 10%

Hopes points out that electronic funds transfer is a natural progression from EDI. "With EDI, you transfer information about the funds you will be sending. But if the actual funds are sent through the mail," he says, "there will still be some matching and inputting of work as well as some delay."

He adds that once a company sends data electronically, there is only an additional 10% effort required for it to send funds as well. He says banks will increasingly transmit both funds and business data and will, in that sense, act as third-party EDI vendors.

Hopes says that in the near future, banks will be able to offer contracts even to smaller businesses so that electronic funds transfer may be the main means of funds transmission.

"We don't yet have nearly the volume to determine how much this is going to cost," he says. "But we've put [together] a large effort to create the software to be able to do this on a wide scale, and prices will definitely drop."

What about the float?

But Hopes says he can see why some businesses might resist implementing electronic funds transfer. He points out that companies are used to sending checks by mail and that cash management systems are based on the fact that checks will not clear for a week or longer after they are sent.

"Electronic funds transfer means more than changing the way we send funds," Hopes says. "It also means we'll have to change the way we manage them."

Determining when the money changes hands was what prevented Ford from using electronic funds transfer. The problem lay in what happens to the lost float — the use of money between the time a company sends a check and the time it is cashed.

Ford's Richards says, "When we were discussing electronic funds transfer, our purchasing people wanted to give the float away and not negotiate it into the price. The treasurer's office wanted to keep it. We had a Mexican standoff."

Super Valu's Klima

While Ford was trying to solve that problem, it conducted a survey of 10 to 12 suppliers. What it found, Richards says, is that suppliers "were more concerned with receiving the check stubs electronically than [receiving] the funds themselves."

Ford is now involved in a pilot project with two suppliers in which the auto company electronically sends information formerly found on the stubs of the check. This transmission relieves the supplier of having to match the stubs with invoices. The check is mailed directly to the supplier or the supplier's bank, as always, and the bank then advises when the funds are available for use.

"Until organizations work out the problems of float," Richards says, "electronic funds transfer will be a tough issue" (see story page 58).

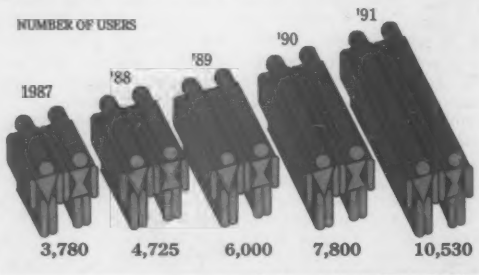
Other companies that have worked hard to institute good cash management procedures worry about what electronic funds transfer will do to their competitive advantage.

"We have a good cash management program, and we get a 2% discount if we pay in 10 days," Super Valu's Klima says. "We don't want electronic funds transfer to level it out, so all purchasers get the same terms and we lose our edge."

EDI is now feasible for most companies because it is based on the accepted cross-industry standard ANSI X12. This acceptance has made it easier for many vendors to develop software that translates flat files into standard formats. Therefore, implementation of EDI can be relatively simple for many users, since they will only have to buy

How many people will use EDI?

Projected U.S. EDI user community growth, 1987 to 1991



INFORMATION PROVIDED BY LINK RESOURCES CORP.
CW CHART: AMY J. SWANSON

3780 MICRO-TO-MAINFRAME 3780

3780 Emulation for PCs and PS/2s

As Low As $695

DataTalker PC Serial interface board $695

DataSYNC 201C Emulation software and modem on one board $1,095

With DataTalker 3780, you can link IBM PCs, PC compatibles, or PS/2s to any major network.

DataTalker 3780 provides full 3780 emulation, along with auto dial/auto answer and attended or unattended operation. Data transmission efficiency exceeds 90%. You also get our high-level Batch Command Language (BCL) and Application Program Interface (API) for fast, easy application development.

Plus, DataTalker 3780 offers a full range of hardware alternatives. Select from a serial interface board, modem boards (201C, 208A/B, or V.22 BIS), a co-processor board, or a stand-alone communications processor.

For details, call us today at 313/662-2002.

WINTERHALTER INCORPORATED
Micro-to-Mainframe Solutions
An Interface Systems, Inc. Company

3796 Plaza Drive ■ PO Box 2180 ■ Ann Arbor, Michigan 48106

DOS, OS, or CICS Frustration?

BIM gets it out of your system.

BIM presents a line of proven programs that maximize your system's capabilities, saving you time, labor and expense. These program products help get the most out of your system and people.

BIMWNDOW — Multiple terminal sessions concurrently at CRT under **DOS** or **OS** VTAM.
BIM-EDIT — The editor with more than 25 significant features that ICCF can't match.
BIMSPOOL — Prints output in POWER/VSE spooling queue on local or remote 3270 terminal printers. (Received ICP Million Dollar Award 1982).
BIMSPOON — On-Line to Batch Print Spooling. Prints data passed from CICS application programs into the POWER spooling queue.
BIM-PDQ — POWER Dynamic Queuing performance enhancement. Eliminates 85% of the I/O to heavily used POWER queue.
BIM-ODIS — Comprehensive problem analysis and display of operational CICS system. **DOS** and **OS.**
BIMTEXT — Word processing, document composition system. Create formatted documents from free-form input. **DOS** and **OS.**
BIMSWAP — Switch local 3270 BTAM terminals between multiple CICS partitions without special hardware or additional ports.
BIMCMPRS — CICS 3270 data compression system. Reduces response time for remote terminals significantly. **DOS** and **OS.**
BIM-FMAP — CICS BMS on-line map generation and maintenance. **DOS** and **OS.**
BIMECHO — Copies one CRT's output to another or printer for problem determination and demonstration.
BIMP3270 — Comprehensive CRT screen image print facility. Copy to terminal printers or spool queue for system printer.
BIMSERV — On-line display of library directories and entries, VSAM Catalog entries, disk VTOC's, etc.
BIMCNSOL — Multiple/Remote System Console function for CICS. Display-only or full input/display versions available.
BIMMONTR — DOS/VSE System Status, Performance Measurement, and POWER Queue display.
BIMSUBMT — On-line Job Edit and Submission facility.

BIM programs are cost-efficient, some as low as $1000, highest $5600. You can save even more with our group package offerings. Products are available on permanent, annual, or monthly licenses, and shipped on a 30-day free trial basis. Product documentation is available on request.

BIM also performs systems programming consulting, with consultants based in Minneapolis and Washington, D.C. Computer time services are also available on our 4331-2 system, on-site or remote.

BIM
B I MOYLE ASSOCIATES, INC.
5788 Lincoln Drive
Minneapolis, MN 55436
612-933-2885
Telex 297 893 (BIM UR)
Member Independent Computer Consultants Assn

and install the software.

Users can implement EDI in two ways. They can develop independent EDI communications directly, or point-to-point, with their vendors or suppliers or they can communicate with their business partners via a third-party network.

A little or a lot?

There are also different levels of EDI implementation. If a company wants to get its feet wet, it can begin by purchasing a personal computer-based system for between $15,000 and $20,000 — including a modem, software and PC — and simply send and receive documents. It is not necessary even to own another in-house computer. The savings is in the cost of postage and preparing the paper mail. The software takes care of formatting the data, so there is no need to have specific knowledge of standards.

But the real benefits of EDI are seen when the system is integrated with the organization's payables, receivables and other files. In this fully integrated scheme, when invoices are received, they automatically go into the payables files, and when purchase orders are received, they automatically go into the shipping files.

The cost of setting up this kind of a system varies, depending on whether the company will need more hardware and the level of development effort it requires. The amount of in-house programming depends on how tightly EDI is to be integrated into the current system.

K Mart's Sweetapple

In general, the cost of high-end software runs about $25,000, but that estimate is assuming the company does not need to buy any more additional computer power.

To cite an example of a complex system, United Refrigerated communicates with customers and with 31 locations from three IBM System/38s. When a release order comes in, it has to be sent to the appropriate location and assigned to the correct truck. Bridges bought translation software but also had to have software written in-house to transfer the release to the order-entry area, which, in turn, controls communications that signal the EDI interpreter to begin and also interfaces with the company's data base.

While cost is a major factor in deciding when and how to implement EDI, most experts warn that once the decision is made, an organization must make the necessary commitment to see it all the way through.

"At the very least," Toebbe says, "you need a committee made up of finance and MIS people who can devote whatever the required time is to develop and oversee the project. EDI demands changes in the way a company does business, and serious effort is needed to realize that."

Third-party vendors

A growing number of EDI third-party vendors offer mailbox store-and-forward services (see story page 55). One such service frees users from having to keep up with minor changes made to standards every six months.

Some EDI users prefer to send and receive transmissions in batch rather than real time. Input's Wheatman says, "It's a question of whether you're set up to receive transmissions at any time during the day or if you want to receive them when you're ready."

While companies can choose whether they want to receive data from third-party vendors, all have to be willing to send data to those vendors when a customer is using the service. Since sending through a third party is about the same as sending direct, most organizations do not mind.

A small number of firms, however, have experienced problems with third-party services and encourage their partners not to use them.

United Refrigerated is one such company. "There is always the potential for problems in computer transmissions," Bridges says, "but when you go through a third-party vendor, the problems are more out of your control."

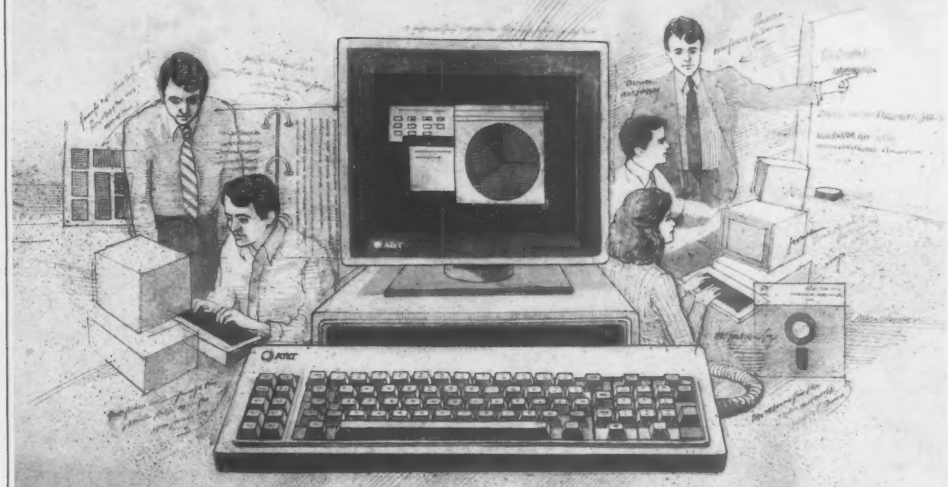
Ford's Richards

The latest development in EDI is that overseas links are becoming stronger. For example, in London last February, International Network Services Ltd. linked its network to the worldwide EDI services provided by GE Information Services. This event created the largest EDI community in the world with more than 2,500 users worldwide.

Also in February, U.S. Customs Service Commissioner William von Raab announced in Brussels that U.S. Customs will actively participate in EDI. Von Raab also said that the Customs Service will adopt Edifact, the newly developed series of international standards for EDI.

U.S. Customs will move forward in this area by establishing its data requirements in international standards and will accept Edifact messages for the current Automated Broker Interface requirements during 1988. To make this transition, Customs will institute a pilot project working with major importers in the U.S. and with European community and Edifact rapporteurs. •

Study with the masters.



Only one company can offer you definitive UNIX® System Training: the company that created the system.

You're serious about learning your craft. You want the insight of a master.

That's why you should call on the people at AT&T.

We'll teach you the UNIX System like no one else can. Because AT&T *created* the System. And we're the ones who keep it on the cutting edge of today's technology.

Our AT&T instructors have mastered the state-of-the-art UNIX System V Release 3. Only they are backed by over 100 years of AT&T's corporate training expertise. And only they limit their classes to a maximum of 20 students, *each on a separate terminal or PC.*

AT&T UNIX System classes are held at locations across the country. And if that isn't convenient enough, we will come directly to *you.*

So if you're serious enough to study with the masters, call AT&T for a class schedule today.

AT&T COMPUTER TRAINING.
Come right to the source.
1-800-247-1212, ext. 830.
Or send in the coupon below.

Registrar, AT&T Training
P.O. Box 45038, Jacksonville, FL 32232-9974
YES! I'd like to learn more about AT&T's UNIX® System education opportunities. Please send a free course catalog and schedule of classes.

Name (Please print) _____
Title _____ Phone ( ) _____
Company _____
Address _____
City _____ State _____ Zip _____
CWC05028

© 1988 AT&T

AT&T
The right choice.

Banks look before leaping into EDI

BY ERIC ARNUM

Banks have the potential to play an enormous role in providing electronic data interchange (EDI) — but they're taking their time about it.

Today, banks primarily perform the electronic funds transfer portion of an EDI transaction for large corporations and their trading partners. However, many institutions are cautious about rushing into more activity.

A survey taken late last year by *American Banker* found that only 26 of the 100 largest banks that supply comprehensive cash management services are making a significant investment in EDI. Most surprisingly, 43 banks said they had no plans to do so.

Filling the wires

Banks are at the forefront of both data processing and data communications, especially when it comes to electronic payments. Between banks, more than $425 billion travels daily on an electronic funds transfer network called the Clearing House Interbank Payment System.

The Federal Reserve Bank runs a payment system called Fedwire, which is regularly overwhelmed by the volumes sent by U.S. Department of the Treasury bond traders and federally chartered banks.

Even though almost all transactions between banks are accomplished electronically, the use of electronic funds transfer systems by payers and payees remains light. Only about 2% of corporate trade payments travel electronically end-to-end from payer to payee on any Automated Clearing House (ACH) network.

Waiting and watching

While an identifiable and measurable benefit can be derived from cash management systems — as well as from EDI for purchase order and invoice management — bankers seem to be waiting to measure the benefit of EDI and electronic funds transfer systems. Initial projections are not encouraging.

For example, even though direct deposit and other direct government payments account for about 45% of the ACH's total volume, the federal government's new Vendor Express system is forecast to save only about $25 million in operating costs, a fraction of its daily operating budget.

Paul Mayland, vice-president of corporate payment services at Manufacturers Hanover Trust Co. in New York, says he is waiting to see what form the integration of electronic funds transfer and EDI will take.

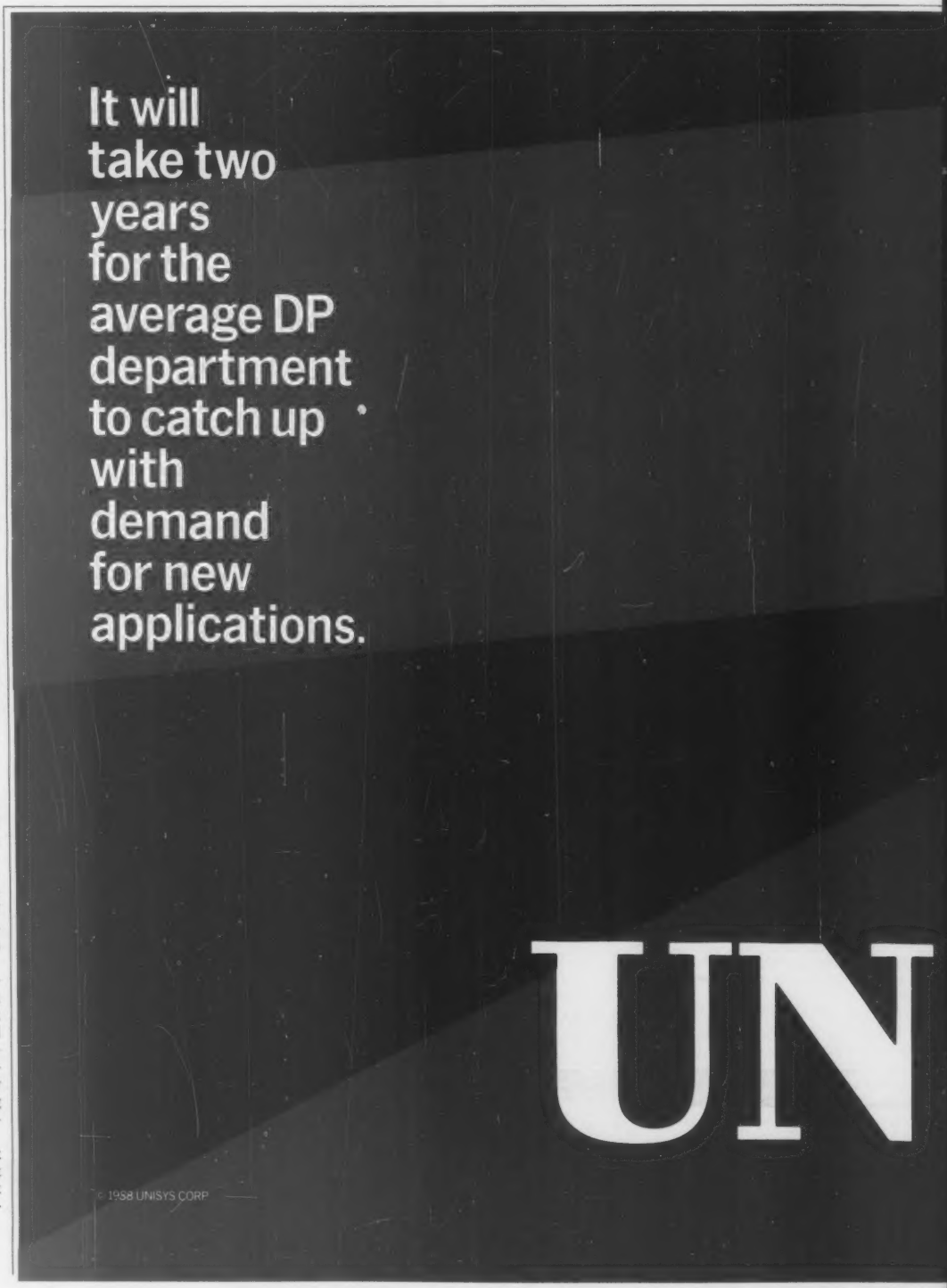
There are three possibilities, he says. Banks could carry both the payment and the supporting reference data; they could carry the payment with a reference number and pass off the actual reference data to an EDI network; or an EDI network could pick up both the payment order and the reference data from customers and pass off the payment order to the appropriate bank.

All three alternatives are technically possible, but the last choice raises significant questions about liability. Communications carriers such as telex networks are usually not liable beyond the cost of a message. Banks are liable for the full value of a payment mistake. But who will be liable when a communications carrier acts as an intermediary between a bank and its customers?

What makes more sense is to appoint a single bank to be the EDI link for an entire network. A partnership of this kind takes advantage of the strengths of both EDI vendors and banks. The banks already have the payment systems in place. EDI vendors have the network links to customers.

For instance, Chemical Bank in New York already relies on

Arnum is editor of "EMMS," a New Canaan, Conn.-based newsletter that covers the E-mail industry.



GE Information Services as the network carrier for its Chemlink cash management service. Would it be unreasonable to give Chemical a mailbox on GE's EDI-Express system? Chemical could then pick up its electronic mail, make the payments and use EDI-Express to send a message to the recipient's mailbox.

The bankers that control the payment systems are anxious to find new sources of fee-based income to replace the money they used to earn on the interest rate spread.

For instance, a bank can derive several hundred thousand dollars each year in fee income from a client that uses its cash management system. This is possible because business-checking clients can, in turn, derive as much or more money from putting their surplus capital to work. But neither a bank nor its clients will find the same cost justification in an EDI system that helps them pay their bills more quickly.

Why? An EDI user will automate the processing and preparation of payment checks as much as possible. This automation will extend as far as the stuffing and stamping of envelopes and possibly even to sorting, to take advantage of lower postal rates.

But from that point, time is on the side of the company paying the bill, because the longer it takes for the payment to make it through the mail, the longer the payer has use of the money. It's a sad fact that the slow and inefficient movement of paper through the mail sometimes has a positive effect.

When the check arrives and is deposited by the supplier, his bank can take advantage of some of those same inefficiencies of paper. The day the check is deposited — or at worst, the next day — the supplier's bank can use one of several electronic networks to clear the check. But the depositor's bank may not credit his account for several days, allegedly because the check takes that long to clear. During those two or three days, the bank can derive income from use of those funds as they "float" through the payment system.

In other words, a paper check

IT'S A sad fact that the slow and inefficient movement of paper through the mail sometimes has a positive effect.

system benefits the payer and the payee's bank at the expense of the payee. A fully electronic system will benefit the payee by wiping out the float. The payer, who can reduce costs in the processing of a payment, takes a loss from its more rapid communication.

Banks will gain nothing from float reduction, because chances are they'll be winners half the time, losers the other. It is no surprise that banks are cautious about extending this capability to their customers.

Funds transfer standards

Various formats have been suggested for company-to-company electronic funds transfer systems that use banks as intermediaries.

The Cash Concentration or Disbursement format is usually used for cash management systems. It is sometimes used for payments, even though it cannot carry much information on what the electronic check is paying for. The Corporate Trade Payment format can carry both the payment and related information, such as the invoice number.

The more elaborate Corporate Trade Exchange (CTX) format is actually part of the ANSI X12 standards currently used in EDI. Last month, the ACH network processed its first CTX payments on behalf of the General Motors Corp. EDI network.

The question is whether either the banks or the EDI vendors are willing to settle for half the market. Once the format questions are settled, the banks can easily push their existing private networks into new applications such as EDI. And once the Glass-Steagal Act restrictions on financial institutions are repealed, virtually any company may be able to accept deposits and make loans. •

A Unisys computer system will get you ahead, instead of keeping you years behind.

Our fourth-generation languages cut programming time by a factor of 10 or more.

With Unisys 4GLs, you can quickly develop new applications and build an integrated software system. Backlog is dramatically reduced. You'll be able to give your user community better command of the information it needs.

But that's not the only way Unisys can help.

Our people have career experience in a wide range of businesses, from defense to manufacturing to banking. So when you're trying to get a jump on user demand, you'll be working with professionals who have done it before in a business like yours.

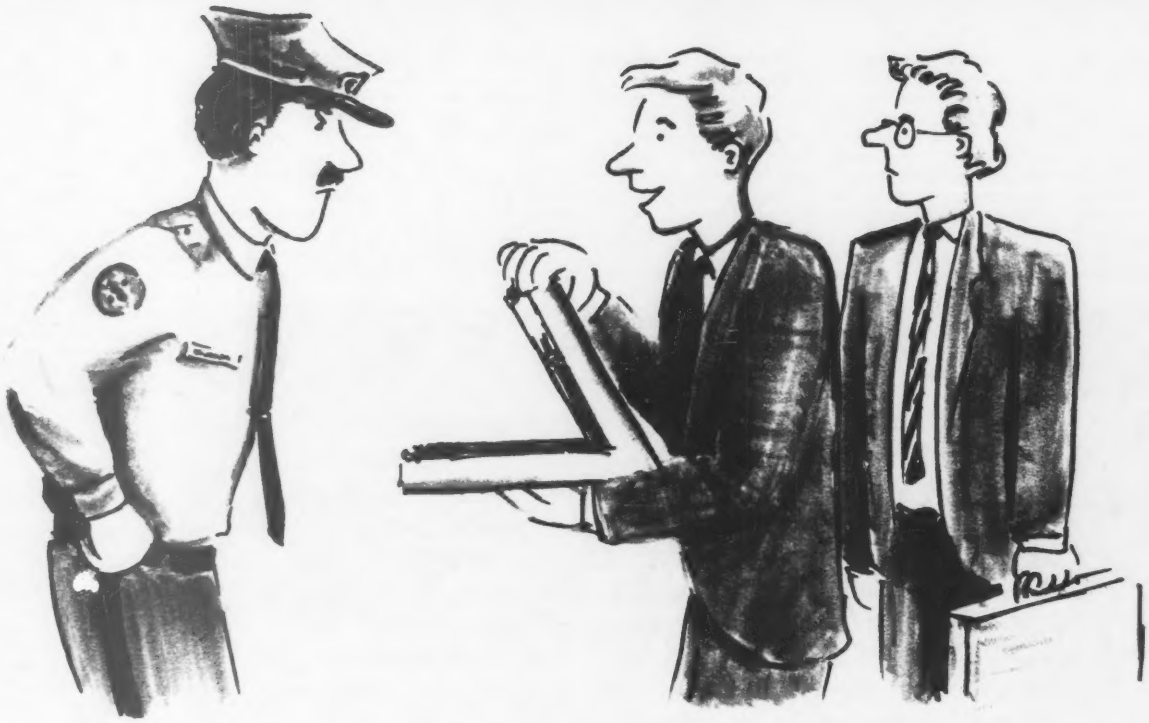
Unisys is a $10 billion international information systems company that offers an integrated product line, from micro to mainframe. Our systems give you a continuous growth path of more than 144 times in computer power, saving costly software conversions.

We believe that by providing better information you can make better decisions.

And a system that helps you get ahead is the best decision of all. BETTER INFORMATION. BETTER DECISIONS.

iSYS

The power of 2



With only one copy of Computerworld per department, security is extremely tight.

The more valuable a publication, the more important it is to have your own copy.

That's why you need your own subscription to COMPUTERWORLD.

Find out what you need to know. When you need to know it.

You'll see what products breakthrough. And what products break down. You'll get the news and views of the industry. And the ads and advice of its leaders.

In fact, with COMPUTERWORLD on top of your desk, you'll be on top of your job.

And there's more. . .

In addition to your 51 issues of COMPUTERWORLD, you'll get — absolutely FREE. . .

12 issues of COMPUTERWORLD FOCUS — an in-depth exploration of a single critical topic each month: communications, data security, PCs, connectivity. . .

Our special Spotlight section. Head-to-head product comparisons with an at-a-glance ratings chart. Security products, LANs, graphics workstations . . . a different product in each issue.

Call today. Or use the return envelope bound into this issue . . . and stop waiting in line.

1-800-255-6286

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Who should spearhead corporate electronic publishing?

An installed base of 200,000 packages — and growing — calls for prompt managerial attention

BY ALAN RADDING

Do you pity the poor desktop publishing guy in the recent Macintosh television ad? Here is an urgent gathering of top executives trying to develop a proposal for a major piece of business, and nobody but the guy with a few Macintoshes in his department can manage to get anything done. He starts out enthusiastically volunteering to take on some responsibilities, and 30 seconds later, everything is being dumped in his lap.

Though obviously slanted toward Apple Computer, Inc.'s views on desktop publishing, this ad dramatizes the chaotic situation in corporate electronic publishing today. "Leadership is lacking now," says David Goodstein, president of Interconsult, Inc. in Cambridge, Mass.

"Local heroes arise to champion local solutions to problems. But who represents the needs and concerns of the corporation as a whole?" he asks. Often, it seems that no one is in charge of corporate electronic publishing.

"You have islands of people at the vice-president level or under doing their own things," says Patricia Seybold of Seybold Office Computing in Boston.

Who will manage and protect the growing data base of text and graphics created for electronic publication? Who should control purchasing decisions about software, laser printers, scanners and workstations?

The investment in corporate electronic publishing is already substantial. According to Goodstein, approximately 200,000 packages were sold in 1987, and shipments of small laser printers are projected to reach one million units annually by 1989.

Radding is a Boston-based author specializing in business and technology.

Money hungry

The bill for corporate publishing of all types is "huge," says Ted Freiser, president of John Diebold & Associates. In its survey of firms with $400 million or more in annual revenue, Diebold turned up the following expenditures:

- A technical division of a major manufacturer spends more than $3 million annually to produce and update its catalogs.
- A software vendor spends nearly $4 million annually to provide manuals for its clients.
- A large utility that publishes direct mail, brochures and billing inserts spends $1.5 million annually.
- A pharmaceuticals company spends more than $3 million on published marketing materials.
- An insurance company spends $3.5 million on rate cards, business forms and manuals.

Goodstein sees some individual departments discovering excellent solutions for specific problems, but nobody is coordinating the overall effort.

While some departments are deeply into electronic publishing, others may be just getting past the era of Linotype machines.

From a hardware perspective, corporate electronic publishing cries out for centralized management. Despite the promise of distributed desktop publishing, some equipment is

MARC YANKUS

- **Islands of automation all over again**
- **Publishing's sponsors are *local* heroes**
- **Text and graphics: New assets to protect**

too expensive for departmental solutions. This hardware must be networked and shared.

Furthermore, the technology yields valuable electronic data bases of text and graphics that must be secured with the same care given the organization's central MIS data bases, says Woodrow Vandever Jr., executive vice-president at Interconsult.

Analysts offer a wide range of views as to how companies might manage corporate electronic publishing. Goodstein recommends perhaps the boldest solution — that companies create a new position, chief publishing officer, or CPO.

"Unlike the previous information technology czars, the CPO's role will be neither to centralize nor to restrict. It will be, rather, to encourage, coordinate and facilitate," he says.

The reason a CPO could not enjoy great centralized power is because corporate publishing is already decentralized. There are different groups to handle publishing for corporate communications, marketing, technical support, design and engineering. Instead of being "a checkbook dictator, enforcing adherence to standards or demanding that all equipment come from one supplier or another," Goodstein says, the CPO would act more as an expert liaison between the office automation, MIS, computer-aided design and reprographics departments.

Not a dictator

Seybold says she does not see a CPO emerging as such to manage the publishing process. Instead, she predicts that control will split along the lines currently in place. "I see no corporate publishing czar. The logical person to run it now would be the CIO: He has the tools, but someone else is actually responsible for the data," she says.

This sharing of responsibility is not very different from the situation in MIS today in which the chief financial officer ultimately controls the organization's financial data, but the director of MIS controls the tools for crunching that data.

Changes in technology are transforming the nature of publishing itself, Seybold maintains. In the past, a document was published when someone sent it to the printer. With electronic technology, some documents may never make it to a printer yet still be widely distributed — "published," but in an electronic sense.

"When we publish something, we really are saying that we're releasing this view to a broader audience. The document is ready for other people to see it in whatever form we're going to use," Seybold says. The document may go to a printer, but it might instead be distributed on compact-disk/read-only memory or through electronic mail.

Diebold's Freiser says he approaches corporate electronic publishing from the standpoint of how the organization is handling its conventional publishing now and exactly what kind of documents it needs. His view is the most conventional in terms of traditional printing and publishing.

Minnesota Mutual's Schultz

"We look at what organizations are producing in-house and what they are producing outside," Freiser says. The goal of the technology, in his view, is to automate a mechanical process to "improve quality at a lower cost."

To manage its investment in corporate electronic publishing, an organization should "allocate responsibility in the same way that it does for other areas," Freiser recommends.

In companies where conventional printing and publishing are already centralized, Freiser says he expects some sort of CPO will emerge. Where printing and publishing are already decentralized, it will be hard to centralize electronic publishing, he warns.

Some level of centralized control, however, is necessary to ensure compatibility and avoid wasteful duplication.

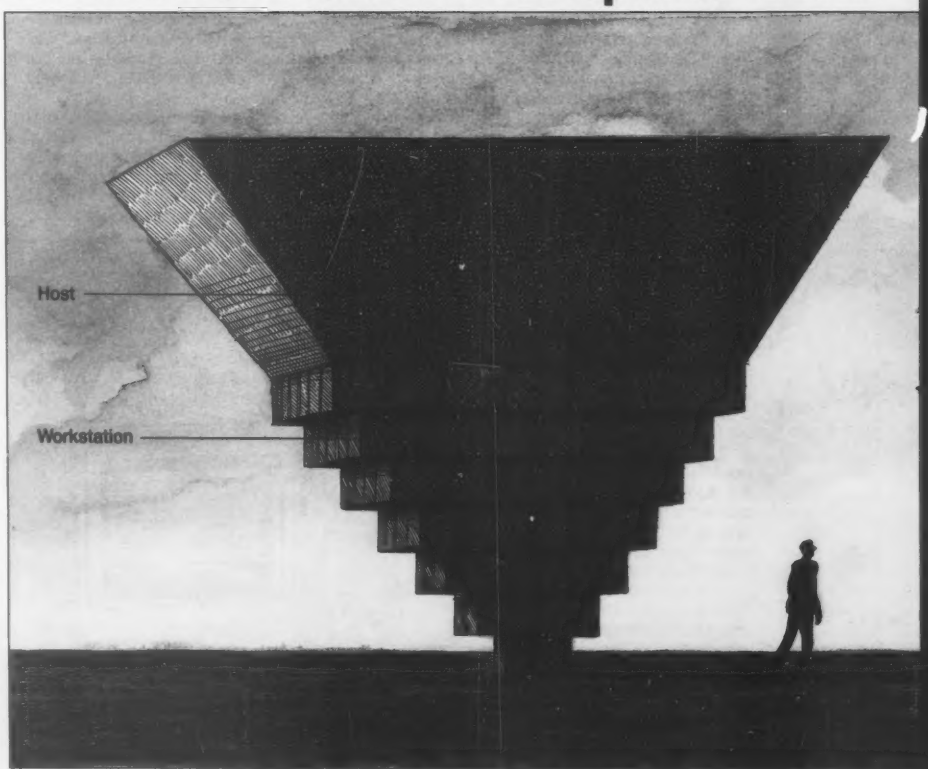
"We recommend some kind of central clearinghouse of information," Freiser says.

He says he has not found any organization yet that has effectively resolved the question of whether to put a single person in control. Corporatewide publishing "is a big mess," he says.

Freiser recommends that, eventually, either a corporate communications or administrative department provide the central direction. He says publishing is not an area that should fall under MIS control. MIS has "a lot of expertise to contribute to a high-expense area," he says, "but there's a much broader issue, which companies have not looked at. The issue is how the company is communicating.

"Computers are an important part of it, so you shouldn't keep MIS out of the decisions. But you shouldn't let them make the decisions either," Freiser continues. He recommends that interested buyers look at the total

Nixdorf. The alternative to the upside-down



Nixdorf builds its system on a solid base from the ground up. Because the alternative is mighty unstable.

Most computer companies start with the host, then attempt to bring the awesome power of the mainframe down towards the workstation level.

In theory, this approach should work. In actual practice, it falls short, for the same reason one does not slosh water from a bucket into a drinking glass – it's almost impossible to fill the glass more than half full, and you get water all over the table.

Nixdorf takes the opposite approach. We begin at the workstation level, where all the actual work is done, and work up to the existing host via a powerful Nixdorf 8860, 8870, or Targon® server. This ensures that all the power in the computer system is usable power, and that none gets wasted in inefficient transmission.

There's another important benefit: The Nixdorf solution is oriented to delivering maximum information and processing power to the ultimate user at workstation level. It is thus no longer necessary to leave it

From forms to documentation to marketing

Different sites are at varying levels of sophistication and volume when it comes to electronic publishing:

• Minnesota Mutual Life Insurance Co. began its publishing efforts with an electronic forms application. To keep up with the volume of paper, Minnesota Mutual was having 90,000 cubic feet of warehouse space filled with preprinted forms. Using electronic-form design software, the company began converting certificates and policies into an electronic counterpart stored on an IBM 3090. Now Minnesota Mutual handles up to 4,000 forms per day.

• At Prime Computer, Inc., documentation is the main focus of corporate electronic publishing. More than 60 writers work on technical documentation, entering their text into a central Prime 50 series computer. Illustrations are handled electronically on another system.

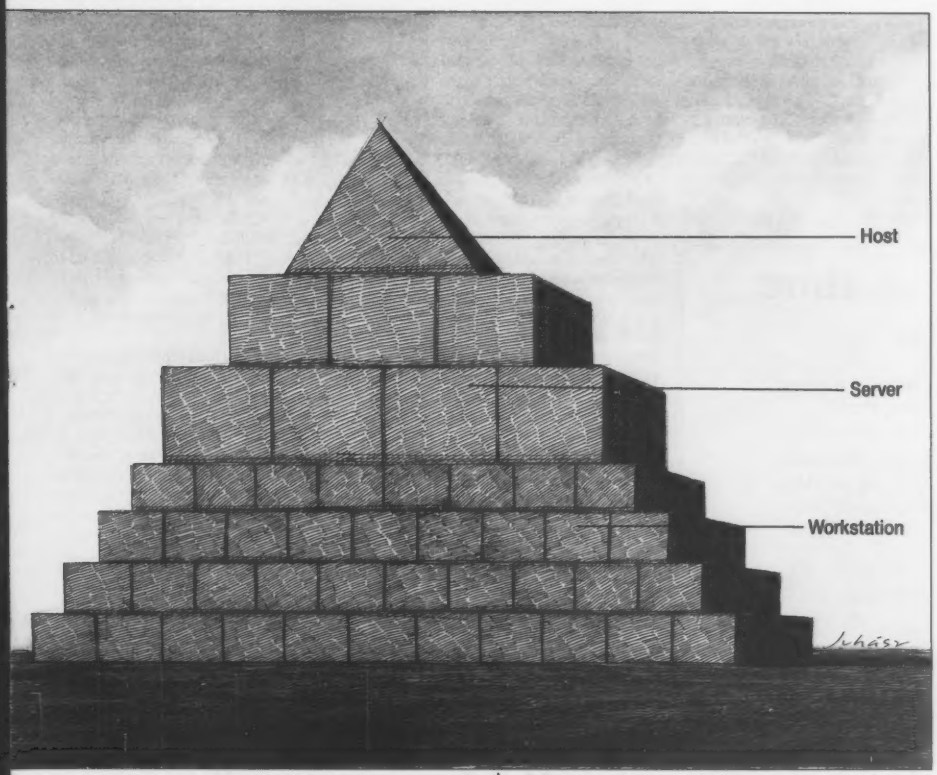
Prime's system is an electronic version of what the technical publishing department had been doing mechanically and is in the initial stages of automation.

• In the 1970s, Caterpillar, Inc., under a rapidly increasing burden of documentation, turned to automated publishing to create and manage text and data, create and manage line art and manage photographs. The Caterpillar system evolved steadily. In 1977, the company installed an Atex, Inc. publishing system to develop an on-line product-support informational data base. Beginning in 1980, Caterpillar built an informational data base for extensive parts catalogs.

In 1985, the company began evaluating personal computer-based graphics workstations. By late 1987, the department started using Apple Computer, Inc. Macintoshes as a graphics design tool. With the Macintoshes, the group is starting to move beyond technical documentation and into marketing areas.

ALAN RADDING

solution.



to a "priestly class" of professional intercessors to decide how isolated company executives may use the system. Data need be entered only once, and the system is fully accessible to all workers, allowing them to be creative, and to share their work product, when appropriate, with every other member of the organization, providing maximum synergy.

Computer experts are free to devote their considerable knowledge and expertise where it should be applied – in facilitating the flow of business throughout the company.

Nixdorf understands the basic principle. A stable pyramid must stand on a solid base.

Nixdorf Computer Corporation
300 Third Avenue, Waltham, MA 02154
Telephone (617) 890-3600

The Best of Both Worlds

NIXDORF COMPUTER

printing and publishing requirements and "make decisions in light of new technologies."

Beginning stages

Companies currently looked upon as models in the implementation of corporate electronic publishing still fall far short of what consultants envision. The reason is that the concept is still in its infancy.

"There are two stages to development," Interconsult's Goodstein says. "First, there is the automation of what you are doing mechanically. Then there is true automation, end-to-end flow and management."

Right now, even most of the leading corporate electronic publishing organizations are still in the first stage, automating the publishing activities they previously accomplished through nonautomated means to realize productivity gains. Once that process is complete, they can move on, producing a system that has more inherent value because it opens new areas of productivity. One such area is a corporate electronic publishing data base, in which all the organization's published information is stored and able to be retrieved.

In 1984, Minnesota Mutual Life Insurance Co. in St. Paul implemented an electronic administrative forms publishing system. In March 1987, the company expanded that system to include policies and certificates. Managing the system is the responsibility of Beatta Schultz, senior office automation analyst, but she expects electronic publishing to grow beyond her and the coordinator who reports to her.

A team of staff members from the particular departments involved manage the current system. The forms management department handles forms design, and information services provides the applicant data. Automation services, which is Schultz's department, coordinates the entire process. Schultz's laser printing coordinator oversees day-to-day operations.

Through corporate electronic publishing, Minnesota Mutual is seeing both a productivity gain

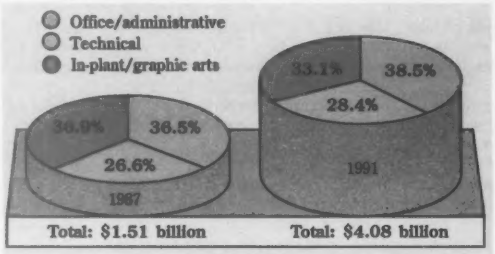
and an improvement in quality. The company saves one cent per page before even administrative savings.

On the administrative side, Minnesota Mutual was able to eliminate seven clerical positions. "The payback for the project is less than two years," Schultz says.

Through the forms library, Minnesota Mutual now owns what will someday be a massive corporate data base of all of its products. With the direct-mail and public relations departments expressing interest, the system is poised to expand, Schultz says.

Corporate consumers

Percentage breakdown of corporate expenditures on electronic publishing by application, projected for 1991



INFORMATION PROVIDED BY CAP INTERNATIONAL, INC.
CW CHART

Not surprisingly, corporate electronic publishing has made its biggest inroads in the technical publishing area. Technical publishing departments have a systems orientation by nature, and technical documentation is often regarded as a major component of an organization's manufactured products. The detailed proposals, parts catalogs and service manuals readily lend themselves to automation.

Ron Bergman, senior manager of technical publications at Prime Computer, Inc. in Natick, Mass., regards himself as a publishing person, not a computer person. He has watched automation grow in the past 25 years from typewriters to corporate electronic publishing.

Bergman's department creates the technical manuals that accompany Prime's products. Five years ago, the department was split off from corporate communications and moved to engineering. The change allowed Bergman's writers to focus better on the products, he claims.

Bergman's technical publishing system remains an island within the organization. Two years ago, the company initiated a corporatewide review of all its publications and established a comprehensive standard that governs the layout and design elements of every document that bears Prime's name, be it a marketing brochure or a specification sheet. Bergman follows that standard, but otherwise, his department remains "fairly independent."

Once the initial automation is complete, Bergman says he wants to pursue some alternative forms of corporate electronic publishing. He is intrigued by technologies such as CD-ROM. "Eventually, I'd like to see us ship in electronic form," he says.

A winner

In 1985, the technical documentation department of Caterpillar, Inc. in Peoria, Ill., produced more than 150,000 new and revised pages, created 10,000 technical illustrations and edited 40,000 photographs.

In addition, the department managed a graphics library containing more than 100,000 line drawings of 200,000 photographs. It produced documents in more than six languages and distributed 23 million microfiche worldwide, according to Lynn Swigart, manager of communications services at Caterpillar's marketing support department.

Interconsult's Goodstein

"If this were my company, I'd establish an independent CPO," he says. Swigart is the closest Caterpillar comes to having a CPO, but his job is not the position championed by Interconsult's Goodstein. Still, Caterpillar is the organization most frequently cited by experts pointing to successful examples of corporate electronic publishing. The company established its initial publishing systems more than 15 years ago. Today, it uses a variety of them to produce technical documentation, publish extensive parts catalogs and price sheets and produce marketing materials. At the same time, other Caterpillar departments ignore the systems altogether and continue to handle their publishing needs in nonautomated ways.

The key to Caterpillar's successful evolution into corporate electronic publishing, Swigart says, lies in the creation of a publishing systems group within his department. The group has expertise in traditional publishing and in computer systems technology. Established in 1978, it is responsible for strategic planning, research, development and implementation of new publishing technologies.

The publishing group works closely with corporate MIS, according to Swigart. In particular, the two departments are jointly developing host-based graphics and data base publishing systems.

Still, Swigart insists that management of corporate electronic publishing should reside outside of MIS. "Companies that only see [corporate electronic publishing] as computer-related and put it into MIS are making a serious mistake," he says.

Needs a boss

The question of who will manage corporate electronic publishing is taking on greater urgency with the proliferation of relatively low-cost desktop publishing throughout the organization. The situation recalls the debates over whether MIS should manage end-user computing.

In the end, the question of who manages corporate electronic publishing comes down to this: Do you manage the technology or the application?

To Swigart and others, the answer is clear: MIS can lay claim to hardware expertise, but the real issue is communication, and, ultimately, "communication is not a DP function." According to this view, MIS has or soon will have the technical expertise to do corporate electronic publishing, but it is up to business managers to figure out how to use these tools in corporate communication. All MIS can do is make them available.

In some ways, the technology parallels spreadsheets: MIS can provide good software, but without anyone managing its use, bad financial models can proliferate.

As Interconsult's Goodstein sees it, the current lack of strong corporate electronic publishing management will not go on indefinitely. "Anything that corporations spend a lot of money on sooner or later has its own manager." •

Running out of time to shop for ...

- Used Equipment
- Software
- Rental & Leasing
- Supplies
- Financial/Business Services
- Hardware
- Communications Equipment
- Time & Services
- Bids & Proposals
- Training Services
- Real Estate

. . . Find what you're looking for in MARKETPLACE and save valuable time!

COMPUTERWORLD
MARKETPLACE

Shop for the products and services you need. Every week.

Smooth Conversion with CTG/DATAWARE

Save money, time, and manpower on your conversion project with CTG/Dataware. Our skilled specialists work with you to ensure a smooth, timely, cost-effective conversion.

COBOL TO COBOL
RPG TO COBOL
RPG TO PL/I
DOS TO MVS
ASSEMBLER TO COBOL
EASYCODER TO COBOL
AUTOCODER TO COBOL
PL/I TO COBOL

CTG/Dataware has the total solution — software, methodology, and support services — to help you change hardware, programming languages, or operating systems smoothly and quickly.

Call the conversion specialists, CTG/Dataware: 1-800-367-2887

CTG
Computer Task Group Inc.
Dataware Conversion Services

3065 Union Road
Orchard Park, New York 14127-1214
(716) 674-9310 TELEX: 510-100-3155

MANAGEMENT

TAKING CHARGE

James Connolly

Plead case to new jury

The exhortations from consultants and successful managers have become a steady background drone for MIS managers in the last few years: Make information a corporate asset, form strategic partnerships with business units, let information systems stand as a peer with sales and manufacturing and so on.

It all makes sense and appears to be sound business advice that everyone in MIS should heed. But there remains one gap those well-intentioned speakers should be filling. They have to pitch their messages to someone outside of MIS. The message has to reach the company president and the non-MIS groups with which MIS wants to work. And the words of advice may ring truest if they come from outside the company, rather than from the president's own MIS group.

Part of the problem, however, is that too many of the management consultants and high-profile MIS managers who speak about their success stories have been preaching to people who agree with them.

Sounds great

Those people in the audience are already trying their hardest to carry out the advice and integrate MIS with the rest of the business world. The speakers

Continued on page 68

MIS in with Schwinn

Walsh wheels and deals to update bike maker

BY NELL MARGOLIS
CW STAFF

CHICAGO — When the photographer arrived at Schwinn Bicycle Co. to take a portrait of MIS Director Robert C. Walsh, he found his subject sporting a blue sweatshirt with "Schwinn" emblazoned in red across the front. "I did have a second thought about it," Walsh says, but his first thought won out.

The sweatshirt says it all: Walsh is a company man.

The 93-year-old company is booming today, in no small part because of the efficiencies brought about when Walsh took its computer operations from a state of decay to state of the art. He supervised the renovation of the warehouse in Chicago's West Loop area, which serves as Schwinn's headquarters, and takes a proprietary interest in the antique bicycles that adorn its halls. But Walsh is no less excited by a modern exercise bike, which he points to, reveling in its space-age technology. It was designed with computer-aided design (CAD) technology that he was instrumental in bringing to the company.

Before joining Schwinn, Walsh headed up systems operations for a small hospital and then for a community college. "He threw himself into them, too, but I think he's really found his niche in business," says Paul Kristofek, Walsh's long-time friend and, until the Walshes moved last summer, his neighbor.

Wheels turning

"When I drive away from work in the evening, I leave it at the company," Kristofek says. "Not Bob. Give him an opportunity, and he'll get up on the Schwinn soapbox any time."

Given half a chance at work, he'll talk about his wife and three teen-age sons, their summer house on the shore of Michigan's Sister Lakes and his latest hobby — flying.

"Bob always has had a very complete outlook on life," Kristofek adds. "He's got a brilliant, calculating mind, and he's also very friendly and outgoing. Bob relates everything to everything."

Walsh brings his holistic view

Continued on page 68

PROFILE

Robert C. Walsh

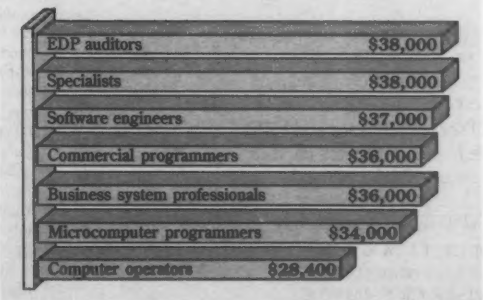
Position: *Director of MIS, Schwinn Bicycle Co. in Chicago.*
Mission: *To achieve productivity and profitability through technology.*
"We're here for the business, not vice-versa"

PHOTO BY STEVE EAGAN

Data View

Special skills pay

Electronic data processing auditors and specialists edge to the top in median salary, while operators lag well behind



INFORMATION PROVIDED BY SOURCE EDP
CW CHART

California smog fuels telecommuting plans

BY J. A. SAVAGE
CW STAFF

SACRAMENTO, Calif. — Oppressive smog and congested highways in Southern California are two reasons a seemingly old concept, telecommuting, is finding new energy. Though it was hailed as a panacea for everything from traffic to boredom in the early 1980s, forecasts of empty office buildings have not yet become a reality.

If there is a future for telecommuting — which some researchers doubt, citing cultural barriers — it is riding in large part on the biggest pilot program to date, sponsored by the state of California.

By this summer, pilot project director David Fleming said he expects to have 250 telecommuters from 11 state agencies, only one-third of who are at a management level. However, those management personnel, particularly middle management, may be the same ones to sabotage the program if they resist the necessary changes in management style.

Continued on page 66

AUTOMATED RUN-TO-RUN BALANCING FOR UNATTENDED OPERATIONS

Call to register for a FREE seminar.

WEST	CENTRAL & MIDWEST	EAST
Dallas, TX 5/18	Indianapolis, IN 5/10	Buffalo, NY 5/3
Houston, TX 5/19	Minneapolis, MN 5/11	New York, NY 5/4
Tulsa, OK 5/20	Detroit, MI 5/12	Hartford, CT 5/5
Denver, CO 6/7	Toronto, ONT 5/13	Boston, MA 5/6
Portland, OR 6/8	Memphis, TN 5/17	Pittsburgh, PA 5/24
Seattle, WA 6/9	Ottawa, ONT 6/2	Philadelphia, PA 5/25
Vancouver, BC 6/10	Toronto, ONT 6/3	Baltimore, MD 5/26
Fort Worth, TX 6/28	Des Moines, IA 6/14	Richmond, VA 5/27
Burbank, CA 6/29	Omaha, NE 6/15	Montreal, QUE 6/1
El Segundo, CA 6/30	Kansas City, MO 6/16	Stamford, CT 6/22
	St. Louis, MO 6/17	Parsippany, NJ 6/23
	Lisle, IL 6/21	New York, NY 6/24
	Chicago, IL 6/29	

Discover the benefits of unattended balancing and control with the Unitech Audit and Control Reporting System (U/ACR). You'll be able to:

Eliminate manual balancing
You won't need to manually post and compare totals again.

Improve data center throughput
There's no need to stop between jobs; U/ACR performs all the control and balancing functions automatically, without interrupting your processing.

Enhance internal control
Reduce the potential for errors, omissions and fraud. U/ACR eliminates human input and verification of data between jobs and job steps.

Automate today
You can get automated balancing today, without changes to your existing application programs or operating system. Stop coding special balancing logic into new applications; U/ACR does it automatically.

Cut data center costs
Find out how you can use Unitech's U/ACR to cut your costs. Call today for more information about U/ACR and an upcoming free seminar in your area. Call 800/842-3000 (in Illinois or outside the U.S., 312/505-1800).

UNITECH SYSTEMS, Inc
Software Products and Services
2200 Warrenville Road, Lisle, IL 60532

1-800-842-3000
In Illinois (312) 505-1800

Telecommuting

CONTINUED FROM PAGE 65

The pilot program includes surprisingly few data processing personnel, Fleming said. He said the bulk of telecommuters are those who write or number-crunch as part of their jobs — lawyers, engineers and program analysts.

Telecommuting is becoming easier and cheaper, according to Fleming. The cost is dropping 25% per year, he said. This is partially because of the lower cost and wider availability of the technology needed to hook up a telecommuter to the main office, and it is partially a trade-off for the higher cost of office space needed in a downtown building to house workers, he said.

Fleming stressed that circumstances have changed in the past 10 years to make telecommuting a more viable option. "Now we're dealing with information more in proportion to the manufacture of widgets. Additionally, it is a solution to business problems, specifically that of retaining employees." For instance, there are more two-income families today, with one member unwilling to move to a new location. Telecommuting is an option that would allow that employee to keep a job.

Savings estimated at $25 million

Fleming's hope is that 10% of the state's work force can spend two to four days a week working out of their homes. "A back-of-the-envelope estimate is that the state can save $25 million a year in the cost of leasing office space," he said.

A law going into effect July 1 will require employers in the smog capital of Southern California, known as the South Coast Air Basin, to encourage employees to stay off the freeways and offer the option of telecommuting.

Pacific Bell is one of the first private companies to jump on the telecommuting bandwagon. It began a pilot program in 1985 with 100 employees. Now, it has an official telecommuting program with between 500 and 1,000 employees, according to a company spokeswoman. However, its program is open only to management-level employees, of which Pacific Bell has 17,000 in California.

The underlying promotion for telecommuting is for Pacific Bell clients, not its employees. Clients in Southern California are expected to need the company's services in order to set up telecommuting to cooperate with this summer's smog legislation.

'Insignificant phenomenon'

While telecommunications companies see telecommuting as a pot of gold, some academics, like Margrethe Olson, associate professor at the graduate school of business administration at New York University, call it an "insignificant phenomenon."

"It's all been 'about to happen' for eight years," Olson said. In a report to the National Science Foundation, she found that "in none of the cases [studied] did management see telecommuting as a significant benefit to the employee or organization. In all cases, supervisors would have preferred the employee on-site if they had the choice."

Fleming acknowledged that, in part,

Project director Fleming

Olson is right: Management is the problem. "It boils down to trust. There must be a shift in management from a passer of information to one of being a leader and coach," he said. "One of the biggest barriers is that middle managers are threatened."

Fleming hopes his pilot project will curb those fears through training and a careful selection of participants who show a predilection for working alone. "The training allows management's worst fears to be let out. It gets them to start thinking." To underscore management's fright, Fleming said some supervisors did not want telecommuters to attend training classes.

Training includes how to set up a home office and how to overcome compulsions, like excessive jogging or excessive eating. "In one case, a telecommuter gained 30 pounds. That person went back to the office," he said.

Coast-to-coast effort

Telecommuting is not a California-only phenomenon, although the smog legislation may be giving it its biggest push.

J. C. Penney Co.'s catalog sales, Montgomery Ward & Co.'s Signature Group in Chicago and Travelers Insurance Co. in Hartford, Conn., are a few companies that use telecommuting, according to Gil Gordon, editor of "Telecommuting Review" in Monmouth, N.J.

"It is more concentrated in California," Gordon said. "There is a high proportion of new businesses where there is no tradition to buck against, and the commuting situation is such that people may be willing to drive two days a week into the office, but not five."

Sure Bet!

XPEDITER® eliminates the guesswork when buying productivity software.

XPEDITER is a programmer's tool that automates testing and debugging in both software development and maintenance. XPEDITER provides thorough testing and effortless debugging in a fraction of the time normally spent.

It's easy...XPEDITER uses a full screen interface and ISPF-like input. You see all the source code just as it appears on your compile listing. You can enter commands as line commands, primary commands or with PF keys. You can apply your knowledge of ISPF and begin using XPEDITER immediately.

It's versatile...XPEDITER supports COBOL and Assembler programs executing under environments such as MVS/SP, MVS/XA, VM/CMS, TSO/ISPF, CICS, IMS/DC, databases, BTS, batch, ROSCOE and HOGAN.

It's proven...XPEDITER supports programmers in over 500 IBM computer centers worldwide.

It's compatible...XPEDITER complements other productivity tools you're using now, and those you may be using in the future.

It's a good buy...XPEDITER pays for itself in as little as three months!

XPEDITER® *it's a sure thing!*

Application Development Systems, Inc.
6840 78th Avenue North, Minneapolis, MN 55445
Canada: 800/433-3583, Minnesota: 612/560-8633 **800/358-3048**

XPEDITER is a registered trademark of Application Development Systems, Inc.
ROSCOE is a registered trademark of Applied Data Research.
HOGAN is a registered trademark of Hogan Systems, Inc.

MacintoshToday

Macintosh Today Qualified Subscription Card

Note: A free subscription to *Macintosh Today* will be sent to those applicants in the U.S. and Canada who qualify. The publisher reserves the right to limit the number of free subscriptions. Please answer all questions completely. Incomplete forms will not be processed. For questions requesting quantities, use specific numbers. Please sign and date this form.

Please accept my request for a free subscription to *Macintosh Today* ☐ **Yes** ☐ **No**

Signature _____

Title _____

☐ **New Subscription Request** ☐ **Free Renewal** ☐ **Address Change (please provide old and new address)**

Please provide your business address below or affix your business card.

NAME

TITLE

COMPANY/DIVISION

MAIL STOP BUSINESS TELEPHONE

STREET

CITY/STATE/ZIP

Old Address: _____

5ABW8

1. Industry (check only one)

Noncomputer-related businesses

- ☐ 1. Aerospace
- ☐ 2. Agriculture, mining, construction, oil
- ☐ 3. Business consulting (noncomputer-related)
- ☐ 4. College/university
- ☐ 5. Elementary/high school
- ☐ 6. Engineering/architecture
- ☐ 7. Finance, banking, accounting, insurance, real estate
- ☐ 8. Government
- ☐ 9. Health/medical services
- ☐ 10. Legal services
- ☐ 11. Manufacturing
- ☐ 12. Military
- ☐ 13. Other business services
- ☐ 14. Publishing/advertising/public relations
- ☐ 15. Research and development
- ☐ 16. Retail/wholesale
- ☐ 17. Transportation, communications, utilities
- ☐ 98. Other (specify) _____

Computer-related businesses

- ☐ 18. Computer consultant
- ☐ 19. Computer retail
- ☐ 20. Distributor/wholesaler
- ☐ 21. Manufacturer (computers, software, peripherals)
- ☐ 22. Service bureau
- ☐ 23. VAR/systems house/integrator
- ☐ 99. Other (specify) _____

2. Title (check only one)

- ☐ A. Chairman/president/owner/partner
- ☐ B. Vice president
- ☐ C. Controller/treasurer/accountant
- ☐ D. Director/supervisor/manager
- ☐ E. Project manager/chief/group leader
- ☐ F. Art director/writer/chief/group leader
- ☐ G. Engineer/scientist
- ☐ H. Administrator
- ☐ I. Consultant/advisor
- ☐ J. Microcomputer specialist/manager/analyst
- ☐ K. Programmer
- ☐ L. Educator
- ☐ M. Professional (lawyer, doctor, etc.)
- ☐ Z. Other (specify) _____

3. Department or function (check only one)

- ☐ A. Accounting/finance
- ☐ B. Administration/management/personnel
- ☐ C. Consulting
- ☐ D. Education/training
- ☐ E. Engineering/R&D
- ☐ F. Manufacturing/production
- ☐ G. Microcomputer center/office automation
- ☐ H. MIS/DP
- ☐ I. Purchasing
- ☐ J. Sales/marketing/distribution
- ☐ Z. Other (specify) _____

4a. Does your company own or lease any mainframe computers at this location?

☐ **Yes** (indicate quantity below) ☐ **No**

	Existing (quantity)	Plan to buy (quantity)
☐ 1. IBM		
☐ 99. Other (specify)		

4b. Does your company own or lease any minicomputers at this location?

☐ **Yes** (indicate quantity below) ☐ **No**

	Existing (quantity)	Plan to buy (quantity)
☐ 1. IBM		
☐ 2. DEC VAX		
☐ 3. Sun/Apollo		
☐ 99. Other (specify)		

5. Does your firm have or plan to buy any of the following types of personal computers or microcomputer systems at your location?

☐ **Yes** (indicate quantity below) ☐ **No**

	Currently own	Plan to buy within 1-12 mos.
1. Macintosh 128/512		
2. Macintosh Plus		
3. Macintosh SE		
4. Macintosh II		
5. IBM or compatible		
6. Sun/Apollo workstation		
99. Other (specify)		

6. Please indicate your involvement with each of the following types of personal computers or microcomputer systems (check all that apply)

	Macintosh	Software	Networks & Peripherals
A. Approve purchase	A. ___	A. ___	A. ___
B. Develop/manufacture	B. ___	B. ___	B. ___
C. Evaluate/select vendor	C. ___	C. ___	C. ___
D. Own one	D. ___	D. ___	D. ___
E. Own two or more	E. ___	E. ___	E. ___
F. Purchase or acquire	F. ___	F. ___	F. ___
G. Establish specifications	G. ___	G. ___	G. ___
H. Recommend to others	H. ___	H. ___	H. ___
I. Sell	I. ___	I. ___	I. ___
J. Train people to use/or provide support	J. ___	J. ___	J. ___
K. Use	K. ___	K. ___	K. ___
L. No involvement	L. ___	L. ___	L. ___
Z. Other (specify by name and quantity)	Z. ___	Z. ___	Z. ___

If you have no involvement with any of the above, skip to question 8.

7. Do you recommend, buy, specify or approve microcomputers, software, and/or peripherals?

☐ **Yes** ☐ **No**

If yes, please indicate for how many Macintosh personal computers you have this involvement. (check only one)

- ☐ A. 1-3
- ☐ B. 4-9
- ☐ C. 10-19
- ☐ D. 20-49
- ☐ E. 50-99
- ☐ F. 100-499
- ☐ G. 500+
- ☐ H. None of the above

8. How many people are employed by your entire company? (check only one)

- ☐ A. 1-9
- ☐ B. 10-24
- ☐ C. 25-99
- ☐ D. 100-499
- ☐ E. 500-999
- ☐ F. 1000-2499
- ☐ G. 2500-4999
- ☐ H. 5000-9999
- ☐ I. 10,000 or more

MacintoshToday

Macintosh Today Qualified Subscription Card

Note: A free subscription to *Macintosh Today* will be sent to those applicants in the U.S. and Canada who qualify. The publisher reserves the right to limit the number of free subscriptions. Please answer all questions completely. Incomplete forms will not be processed. For questions requesting quantities, use specific numbers. Please sign and date this form.

Please accept my request for a free subscription to *Macintosh Today* ☐ **Yes** ☐ **No**

Signature _____

Title _____

☐ **New Subscription Request** ☐ **Free Renewal** ☐ **Address Change (please provide old and new address)**

Please provide your business address below or affix your business card.

NAME

TITLE

COMPANY/DIVISION

MAIL STOP BUSINESS TELEPHONE

STREET

CITY/STATE/ZIP

Old Address: _____

5ABW8

1. Industry (check only one)

Noncomputer-related businesses

- ☐ 1. Aerospace
- ☐ 2. Agriculture, mining, construction, oil
- ☐ 3. Business consulting (noncomputer-related)
- ☐ 4. College/university
- ☐ 5. Elementary/high school
- ☐ 6. Engineering/architecture
- ☐ 7. Finance, banking, accounting, insurance, real estate
- ☐ 8. Government
- ☐ 9. Health/medical services
- ☐ 10. Legal services
- ☐ 11. Manufacturing
- ☐ 12. Military
- ☐ 13. Other business services
- ☐ 14. Publishing/advertising/public relations
- ☐ 15. Research and development
- ☐ 16. Retail/wholesale
- ☐ 17. Transportation, communications, utilities
- ☐ 98. Other (specify) _____

Computer-related businesses

- ☐ 18. Computer consultant
- ☐ 19. Computer retail
- ☐ 20. Distributor/wholesaler
- ☐ 21. Manufacturer (computers, software, peripherals)
- ☐ 22. Service bureau
- ☐ 23. VAR/systems house/integrator
- ☐ 99. Other (specify) _____

2. Title (check only one)

- ☐ A. Chairman/president/owner/partner
- ☐ B. Vice president
- ☐ C. Controller/treasurer/accountant
- ☐ D. Director/supervisor/manager
- ☐ E. Project manager/chief/group leader
- ☐ F. Art director/writer/chief/group leader
- ☐ G. Engineer/scientist
- ☐ H. Administrator
- ☐ I. Consultant/advisor
- ☐ J. Microcomputer specialist/manager/analyst
- ☐ K. Programmer
- ☐ L. Educator
- ☐ M. Professional (lawyer, doctor, etc.)
- ☐ Z. Other (specify) _____

3. Department or function (check only one)

- ☐ A. Accounting/finance
- ☐ B. Administration/management/personnel
- ☐ C. Consulting
- ☐ D. Education/training
- ☐ E. Engineering/R&D
- ☐ F. Manufacturing/production
- ☐ G. Microcomputer center/office automation
- ☐ H. MIS/DP
- ☐ I. Purchasing
- ☐ J. Sales/marketing/distribution
- ☐ Z. Other (specify) _____

4a. Does your company own or lease any mainframe computers at this location?

☐ **Yes** (indicate quantity below) ☐ **No**

	Existing (quantity)	Plan to buy (quantity)
☐ 1. IBM		
☐ 99. Other (specify)		

4b. Does your company own or lease any minicomputers at this location?

☐ **Yes** (indicate qua..tity below) ☐ **No**

	Existing (quantity)	Plan to buy (quantity)
☐ 1. IBM		
☐ 2. DEC VAX		
☐ 3. Sun/Apollo		
☐ 99. Other (specify)		

5. Does your firm have or plan to buy any of the following types of personal computers or microcomputer systems at your location?

☐ **Yes** (indicate quantity below) ☐ **No**

	Currently own	Plan to buy within 1-12 mos.
1. Macintosh 128/512		
2. Macintosh Plus		
3. Macintosh SE		
4. Macintosh II		
5. IBM or compatible		
6. Sun/Apollo workstation		
99. Other (specify)		

6. Please indicate your involvement with each of the following types of personal computers or microcomputer systems (check all that apply)

	Macintosh	Software	Networks & Peripherals
A. Approve purchase	A. ___	A. ___	A. ___
B. Develop/manufacture	B. ___	B. ___	B. ___
C. Evaluate/select vendor	C. ___	C. ___	C. ___
D. Own one	D. ___	D. ___	D. ___
E. Own two or more	E. ___	E. ___	E. ___
F. Purchase or acquire	F. ___	F. ___	F. ___
G. Establish specifications	G. ___	G. ___	G. ___
H. Recommend to others	H. ___	H. ___	H. ___
I. Sell	I. ___	I. ___	I. ___
J. Train people to use/or provide support	J. ___	J. ___	J. ___
K. Use	K. ___	K. ___	K. ___
L. No involvement	L. ___	L. ___	L. ___
Z. Other (specify by name and quantity)	Z. ___	Z. ___	Z. ___

If you have no involvement with any of the above, skip to question 8.

7. Do you recommend, buy, specify or approve microcomputers, software, and/or peripherals?

☐ **Yes** ☐ **No**

If yes, please indicate for how many Macintosh personal computers you have this involvement. (check only one)

- ☐ A. 1-3
- ☐ B. 4-9
- ☐ C. 10-19
- ☐ D. 20-49
- ☐ E. 50-99
- ☐ F. 100-499
- ☐ G. 500+
- ☐ H. None of the above

8. How many people are employed by your entire company? (check only one)

- ☐ A. 1-9
- ☐ B. 10-24
- ☐ C. 25-99
- ☐ D. 100-499
- ☐ E. 500-999
- ☐ F. 1000-2499
- ☐ G. 2500-4999
- ☐ H. 5000-9999
- ☐ I. 10,000 or more

MacintoshToday

15. Please list below any individuals at this location who also help to recommend, specify, acquire or approve the purchase of computer systems, peripherals, software or services to whom you would like us to send a complimentary subscription of Macintosh Today.

Name: _____ **Title:** _____
Name: _____ **Title:** _____
Name: _____ **Title:** _____
Name: _____ **Title:** _____

Please fold, tape and mail.
PLEASE DO NOT STAPLE.

Fold ▼

Name
Company
Address
City/State/ Zip

AFFIX
POSTAGE
HERE

MacintoshToday
Subscription Department
P.O. Box 5456
Pasadena, CA 91107-0456

MacintoshToday

15. Please list below any individuals at this location who also help to recommend, specify, acquire or approve the purchase of computer systems, peripherals, software or services to whom you would like us to send a complimentary subscription of Macintosh Today.

Name: _____ **Title:** _____
Name: _____ **Title:** _____
Name: _____ **Title:** _____
Name: _____ **Title:** _____

Please fold, tape and mail.
PLEASE DO NOT STAPLE.

Fold ▼

Name
Company
Address
City/State/ Zip

AFFIX
POSTAGE
HERE

MacintoshToday
Subscription Department
P.O. Box 5456
Pasadena, CA 91107-0456

Macintosh

has what you want. Timeliness. Side-by-side product comparisons. Trends and new technologies. Profiles of Macintosh users. Useful tips. Industry news and inside information.

When you read *Macintosh Today*, you know what's going on in the Mac marketplace. We have the most experienced editors ever assembled to produce a Macintosh publication. We know what we're writing about.

Macintosh Today was created *on* the Macintosh *for* the Macintosh. Its clear design and high quality make it easy to read for busy Macintosh users.

Best of all *Macintosh Today* is FREE to qualified volume Macintosh business and technical users. To qualify, fill out the qualification card and return it promptly.

If you wish to receive extra reader qualification cards, call 818.577.7233.

Best then.

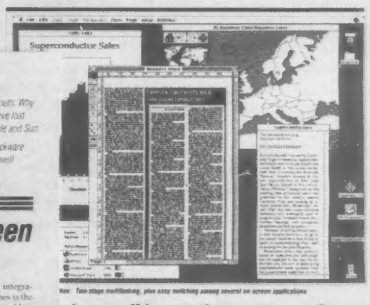
August 11, 1987
Vol 1, No 1

Premier Issue!

COMMUNICATIONS · PERSPECTIVES · REVIEWS

MultiFinder, HyperCard highlight Expo

250 vendors offer multitude of new Macintosh products



January 25,1988
Vol 2, No. 2

MacintoshToday

Users hail Mac-to-VAX link; DEC has even bigger plans

Apple's LU 6.2 seen in show spotlight

22 companies form users group for professionals

Communications program adapts Mac interface to remote systems

Expo packs 'em in

shows off innovative system software

ST LOOK AT HYPERCARD

Levco promises 200-MIPS Mac II

Best now.

Send in your qualification card today!

Schwinn

FROM PAGE 65

of life to work.

"You can't look at a company's technology structure as separate from the company's business function: what it makes, what it sells, how it's organized," Walsh says. "To believe in tech for tech's sake, as existing outside the business, is to court catastrophe."

Walsh describes himself as "Peter Principled into MIS — I failed at being a programmer, so I got put in charge of systems." He first worked in MIS at Little Company of Mary Hospital in Chicago, and recalls meeting with constant frustration.

"People would come to MIS with legitimate needs and get told, 'I'll have it for you in a year.' That is answering in an MIS time frame, not in a business time frame," Walsh says.

When he left the hospital for Moraine Valley Community College in Palos Hills, Ill., where he headed systems operations for eight years, his philosophy was in place: "Ask, What does the business need?"

Shared philosophy

Walsh brought that philosophy to Schwinn in 1980, when he arrived with a mandate to turn a 20-year-old system into a lean, mean, competing machine "preferably yesterday," he recalls.

Walsh walked into a computer department that was writing in assembler. Five years and more than $600,000 later, Schwinn had gone through a series of system upgrades, replacing Singer Co. System 10 minicomputers with IBM System/34s and, subsequently, System/36s and installing a payroll software system from Management Science America, Inc. and the Adabas data base management system and Natural fourth-generation language from Software AG of North America, Inc.

"Software like Adabas and Natural," Walsh says, "allows the systems folks to have a great amount of empathy with the end users. For example, because you can add data elements so easily, you don't find yourself saying, 'What's your two-year plan?' to an employee who's thinking, 'If I don't get this inventory in order in four months, I'm not gonna *be* here in two years.' "

Wheelin' and dealin'

"Bob's great strength is being able to work within a company structure to get things taken care of for both the MIS department and the corporate guys," says Steve Arnold, systems programmer at Schwinn. "He's good at wheelin' and dealin'— he really gets into the game."

Both Arnold and Schwinn's Ruth Bartelt, systems and programming manager, are second-time teammates of Walsh's: The three worked together at Moraine Valley where first Bartelt and then, after Bartelt left for Schwinn, Arnold succeeded Walsh as MIS director.

"That tells you something right there," says Bob Van Raes, Moraine Valley's vice-president of planning and external affairs. "It's a chancy enough proposition just to go back to work for your old boss in a new setting; Ruth and Steve gave up titles and control to work with Bob again."

At Moraine Valley, Van Raes recalls, Walsh's wheeling-and-dealing instincts were complemented by "his eagerness to help people and his likable qualities. Bob could somehow make suggestions to people in a very nonthreatening way and get them to cooperate when other people had just gotten their backs up."

Mike Fritz knows just what Van Raes is talking about. Two years ago, Fritz, newly arrived at Schwinn as director of engineering, set out to automate the bicycle design department.

As a new guy in town trying to sell an IBM-loyal administration on costly CAD workstations, Fritz turned somewhat reluctantly to the MIS director.

"My initial feeling was that Bob would be a problem. He was an IBM loyalist, and design was in his territory," Fritz says. "But I couldn't have been more wrong."

Walsh "went to bat and did a great job for us," Fritz says. Not only did he deploy his negotiating skills on Fritz's behalf, both in dealing with Apollo Computer, Inc. and in selling Schwinn's "True Blue" front office on the CAD workstation concept, but he also suggested that Fritz double the number of Apollo systems he was requesting.

Is it Christmas?

"The key to the company's real benefit is getting one of these babies on every designer's desk," Fritz remembers Walsh saying. "All I could think was, this guy's got to be Santa Claus."

Today, Fritz oversees a $500,000 Apollo-based CAD operation; Schwinn Bicycle ranks as the leading independent U.S. bicycle maker; and Walsh has a $3 million MIS budget to play Santa Claus with — a far cry from the $700,000 budgeted for MIS in 1979.

Walsh's negotiating skills and passion for immersing himself in the company have taken him further afield of MIS than the bicycle design department.

When the building renovation began in 1986, all he had to do was lay out the computer room, but he made so many suggestions that "Ed Schwinn basically said, 'Good. If you're so smart, you can do the whole thing,' " Walsh recalls. The hard hat he wore while moonlighting as Schwinn construction manager sits on his office windowsill.

These days, Walsh is wearing his MIS hat again: In late March, he plunged into what promises to be the "long, hard but worth it" task of installing a new management software system made by Atlanta-based American Software, Inc. and training Schwinn distributors to use it.

"We could raise our level of service to dealers," he says, "lower inventory costs, increase information supply; we'll get smarter, better dealers. . . ."

There he goes again. Spokesman. Wheeler-dealer. Company man.

Connolly

FROM PAGE 65

are telling a friendly crowd just what it wants to hear. Too often, the speeches are being met with enthusiastic applause from MIS managers and followed with an over-coffee comment like, "Great, I just wish my company would let me do it."

A perky cheerleader-consultant comeback to that observation is, "But you have to make it happen." That's right, and that consultant probably used to be one of those financial advisers who tell people they can be rich if they save 25% of their income. It sounds nice, but reality hits like a ton of bricks.

Suspicion

In the case of MIS/business relationships, reality is that many people are suspicious of anything their own MIS department suggests. That might be called the what-do-you-really-want syndrome or the you-do-computers-and-I-do-sales complex.

Another rule of reality is that when you buy an idea from an outsider — whether through a consulting service or through the registration fee at a conference — it sounds a lot better than something you get for free via an aide's memo. Don't ask why; it's just human nature.

Some consulting groups say they have turned their attention toward company presidents and other non-MIS executives. But there should be a more concentrated effort to reach those people who think a spooler is just something used in a textile shop.

Whoever pitches the strategic systems concepts to non-MIS people — whether they are consultants or MIS success stories doing the talking — should work extra hard to keep their speech nontechnical and their proposals in business terms.

The most important of those business terms is "impact on the bottom line."

In addition, MIS managers — or anyone else making such a presentation — should keep in mind that changes to make use of the information for which MIS is the caretaker, moves such as realigning the reporting lines on the organization chart, for example, may be no better than conflicting changes that make better use of manufacturing's capabilities or the distribution network.

> IN THE case of MIS/business relationships, reality is that many people are suspicious of anything their own MIS department suggests.

Even when information is an asset, it is not necessarily the most important asset.

The information age/strategic systems message may have found a sympathetic ear in the MIS department, but there remains a large part of the world that has not heard it or at least has not welcomed it. Those are the people who need to be targeted next.

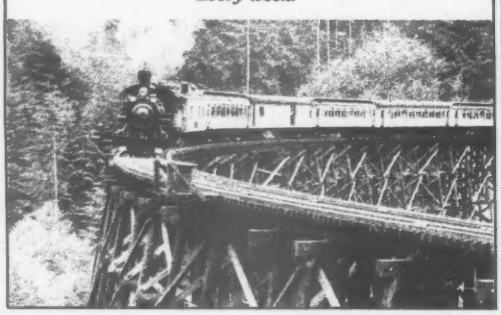
Connolly is *Computerworld's* senior editor, management.

Looking for computer training services?

MARKETPLACE puts you on the right track.

COMPUTERWORLD
MARKETPLACE

Shop for the products and services you need. Every week.



Need to rent or lease computer equipment?

Find what you're looking for with the *leased* amount of effort — in MARKETPLACE.

COMPUTERWORLD
MARKETPLACE

Shop for the products and services you need. Every week.

COMPUTER INDUSTRY

INDUSTRY INSIGHT

Clinton Wilder

What's next for lessors?

Now may be the best time in years to lease a computer rather than buy it. And that has the computer leasing industry worried.

In the IBM equipment marketplace, unprecedented competition from IBM Credit Corp., the regional Bell holding companies and large and small independent lessors has brought the leasing industry to a crossroads. Lease rates and profit margins on IBM deals have dropped, resulting in a boon for lessees and a search for new markets by the leasing industry.

The sense of an industry about to turn a corner was palpably evident at the biannual meeting of the Computer Dealers and Lessors Association (CDLA) 10 days ago in Palm Desert, Calif. Held just six weeks after the sudden death of CDLA President Jim Benton, the meeting was dominated by official and informal tributes to Benton's dynamic leadership and lobbying victories. But the association moved quickly to ensure a smooth transition at the top, naming Econocom Chairman Ken Bouldin as Benton's successor.

Benton's gregarious style was perfect for advancing CDLA interests on Capitol Hill, where tennis with senators and cabinet members counts for a lot in the high-stakes game of lobbying. Bouldin's challenges will come on a variety of other fronts, but the low-key Southerner's successful business career should be a solid base from which to lead his colleagues and competitors.

In a sense, the leasing companies are feeling pressure brought about by their own success. With profits there for the taking through the years, more and more entrepreneurs have entered the business and are now competing aggressively.

Then there are the deep pockets, like Bell Atlantic and Bellsouth, which have both acquired major lessors and can afford to squeeze margins to gain market share. And the deepest pocketed player of all is still playing hardball. At the recent

Continued on page 72

Foreign sales buoy first quarter

Growth abroad aids boomers like Compaq, does little for mini makers

BY JAMES DALY
CW STAFF

Strong sales in the international market added luster to the good financial performance of some companies and saved others from dipping into red ink, according to first-quarter results posted last week.

"The international market tends to lag our market in terms of development and evolution by anywhere from a year to four years, and the growth overseas right now is very strong," said Charles R. Wolf, vice-president of equity research at First Boston Corp. "We believe this growth will be sustained for the rest of the year."

Overseas sales buoyed the results of firms like Compaq Computer Corp. but were able to offer only slight gains to those firms caught on the slippery footing of the minicomputer market, which has been pinched at both ends by brisk mainframe and personal computer sales.

The quarter was particularly tough on Alliant Computer Systems Corp. Despite revenue growth of nearly 13% from year-earlier results, the Littleton, Mass., minisupercomputer maker was not able to hold onto the extra cash. Income from operations plummeted 97% from $2.3 million a year earlier to a meager $71,000.

Fellow minisupercomputer maker Convex Computer Corp. was not as badly hit as Alliant, but "their results are nothing to write home about," said John L. Rutledge, an analyst at Dillon Read & Co.

Although revenue for the Richardson, Texas, company rose a significant 53% from year-earlier figures, profits dropped nearly 47%, to $1.1 million.

No room to grow

"Convex and Alliant have chosen to remain in a very competitive niche market that has simply absorbed about all it can," Rutledge added. "They've both chosen to compete in the engineering and scientific area and not go into the commercial market. Their area was saturated more quickly than the commercial

Continued on page 72

1988 first-quarter earnings

Profits slide at Alliant, Convex and Hogan; but Stratus is strong, and Compaq soars

	January through March ($ millions)	Percent change[1] from 1987	January through March ($ millions)	Percent change from 1[illegible]
Alliant	$0.9[2]	(62)	$13.6	13
Ask Computer Systems	$2.6	58	$37	46
Bolt Beranek & Newman	$4.5	22	$79.5	35
Comdisco	$20[3]	43	$310	1
Compaq	$46.8	132	$439.5	108
Control Data	$7.7[4]	7	$902.2	10
Convex Computer	$1.1[5]	(47)	$22.1	53
Hogan Systems	$1.1	(66)	$12.8	(12)
Informix Software	$2.4	14	$25.8	98
Management Science America	$2.4	—[6]	$62.9	18
Stratus	$5.9	60	$54.2	45
Tandem	$23.3[7]	4	$309.4[8]	26

[1] Parentheses indicate decrease
[2] Includes $733,000 in extraordinary credits
[3] Excludes $5 million from discontinued risk arbitrage business
[4] Includes $3.1 million in extraordinary credits
[5] Includes $270,000 in extraordinary credits
[6] Reported $2.3 million operating loss in 1987
[7] Includes $9.4 million pretax charge
[8] Includes $13.5 million from companies acquired during quarter

CW CHART

Micom eyes offers for acquisition

BY PATRICIA KEEFE
CW STAFF

SIMI VALLEY, Calif. — Micom Systems, Inc. revealed last week that it is considering several acquisition offers, adding that those proposals led it to cancel plans for a stock buy-back offer of nine million shares.

The announcement triggered speculation that even if Micom itself was not sold, any or all of its three subsidiaries — Micom-Interlan, Inc., Spectrum Digital Corp. and Black Box Corp. — might be.

The announcement of a possible Micom sale comes on the heels of the recent merger between Network Equipment Technologies, Inc. (NET) and Excelan, Inc., and a sale would continue the year-long trend of major consolidation in the communications market.

If the entire company were to be sold, it would likely constitute the largest sale during this period of consolidation. For the fiscal year ended April 3, Micom's revenue was $223 million. In contrast, 3Com Corp. and Bridge Communications, Inc. today have combined revenues of $180 million, and NET and Excelan together have revenues of about $101.7 million.

Micom sells local- and wide-area networking products. Inter-

Continued on page 71

AT&T taps Kavner; Cassoni departs

BY ALAN ALPER
CW STAFF

NEW YORK — Just when it appeared that AT&T's long-suffering computer business was beginning to turn around, the chief architect of that comeback is returning to his native Italy.

Vittorio Cassoni, the Ing. C. Olivetti & Co. executive recruited 18 months ago to revitalize AT&T's ill-fated foray into the computer business, has decided to return to Olivetti as chief executive officer. Robert Kavner, 44, AT&T's chief financial officer, will succeed Cassoni as president of AT&T's Data Systems Group (DSG), effective May 15.

The departure of Cassoni, a dynamic leader and strategist, comes at an inopportune time for the telecommunications giant. After three disastrous years, Cassoni has considerably cut DSG's losses, appears to have implemented an effective strategy based on data networking and Unix and has persuaded AT&T executives to provide DSG with a sales force to deal directly with MIS management.

Cassoni was also the driving force behind the firm's fledgling alliance with Sun Microsystems, Inc.

"This is part of a major [AT&T] shift away from Olivetti and toward Sun," explained Ken Leon, an analyst with Bear, Stearns & Co. He cited Sun's recent entry into the Microsoft Corp. MS-DOS-compatible microcomputer business as evidence of another potential tie between the two companies.

Both Cassoni and Kavner denied that strained relations between AT&T and Olivetti had anything to do with Cassoni's departure. "Olivetti wanted [me] earlier, and AT&T wanted it to occur at a later time," Cassoni said. "We did it at a time that balances both corporations' needs." AT&T owns 22% of Olivetti, and the two firms have various cross-marketing agreements.

AT&T's Kavner

Cassoni said it was he who recommended Kavner as a successor. Kavner, who joined AT&T in 1984 from Coopers & Lybrand, where he headed the Information Industry Practice, is considered one of the up-and-coming executives at AT&T. Although he lacks direct experience within the computer industry, analysts contend that his financial orientation could accelerate DSG's efforts to become profitable by 1989.

Kavner claims a strong background at Coopers & Lybrand in systems design and integration. As AT&T's chief financial officer, he presided over an internal data processing operation of some 17,000 employees. End users, he contends, are driving the acceptance of tech-

Continued on page 72

INDUSTRY WEEK IN BRIEF

Less than one month after he was named chief scientist at **Borland International, Inc.**, Rob Shostak, cofounder of **Ansa Corp.** and co-developer of its Paradox data base product, resigned last week. He will be cofounding another software start-up, as yet unnamed, funded by venture capital firms. "My work is complete at Borland, and I'd rather put my talents to use at an emerging company," Shostak said. Scotts Valley, Calif.-based Borland acquired Ansa last fall.

MAI Basic Four, Inc. Chairman and principal owner Bennett S. LeBow, along with board member William Weksel, have decided to sell their stake in the Tustin, Calif., turnkey systems vendor. Together they control about 60% of MAI stock, including 17% in trusts for the benefit of LeBow's family. MAI stock soared on the news, gaining 3⅞ points to a new yearly high of 19 in active trading Wednesday.

General Electric Co. announced the sale of its **Calma Co.** integrated-circuit computer-aided design (CAD) business to San Jose, Calif.-based **Valid Logic Systems** for an undisclosed amount of stock, cash and royalty payments. With an estimated 2,700 users, Calma's integrated-circuit CAD business had revenue of about $40 million in 1987.

Gambling that its bus architecture will become the graphics supercomputer industry standard, **Ardent Computer Corp.** will be the first supercomputer company to license its bus. The system bus used in Ardent's newest graphics supercomputer, Titan, will be available for licensing in September. It will cost only $250 for universities or research institutions — but $15,000 for commercial entities. A spokesman said Ardent hopes the licensing arrangement will encourage the development of peripherals that plug into the Ardent bus.

The computer and component revenue of **Zenith Electronics Corp.** easily surpassed Zenith's revenue from its ailing consumer electronics business for the third straight quarter in the three months ended April 2. Sales of computer systems and components reached $350 million, up 29% from the year-earlier quarter and accounting for 61% of Zenith's total sales. Revenue from the consumer electronics unit, which is rumored to be for sale, dropped 18% to $224 million.

Financial woes continued for artificial intelligence software developers **Intellicorp** and **Teknowledge, Inc.** In the third fiscal quarter ended March 31, Intellicorp lost $269,000 on sales of $5 million, and Teknowledge lost $1.1 million on revenue of $3.5 million.

IBM in fighting form, Akers tells group of shareholders

BY MITCH BETTS
CW STAFF

RICHMOND, Va. — IBM Chairman John Akers last week said IBM is becoming a leaner and more aggressive company in response to competitors who are "fast on their feet, listening to their customers [and] impressive in technological innovation."

Akers, addressing shareholders at IBM's annual meeting here, said IBM began a turnaround in mid-1987, and since then, earnings have grown faster than revenue. He called it "a bottom-line confirmation of efficiency and competitiveness."

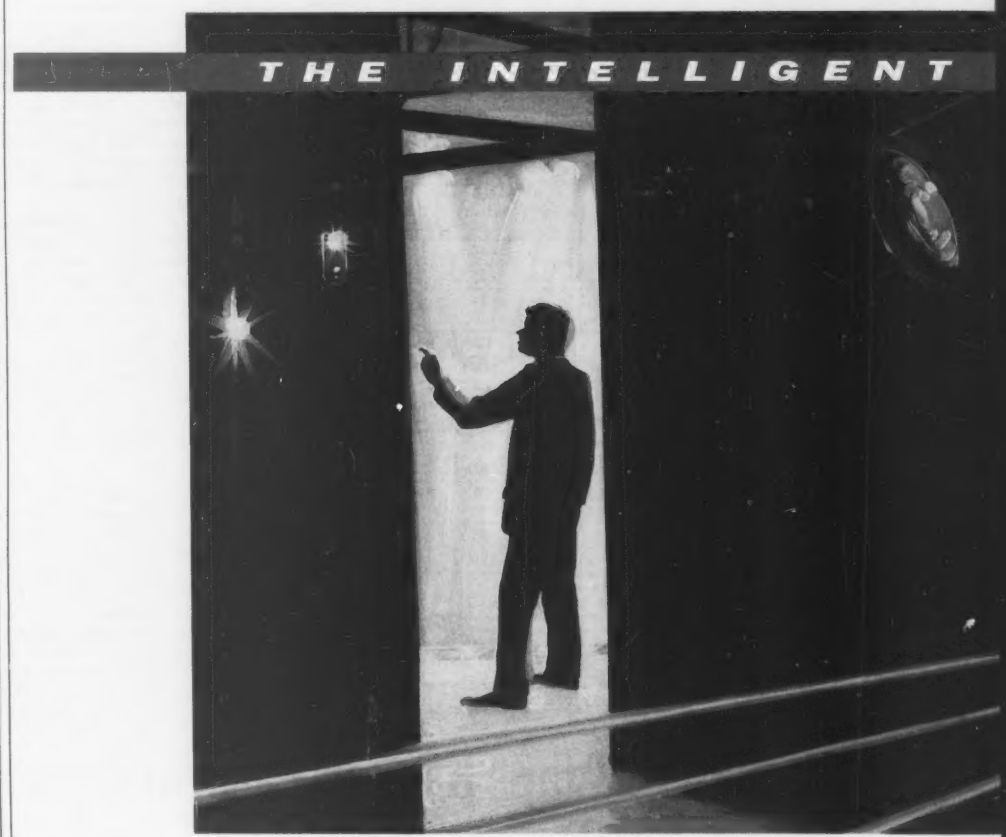
IBM is a stronger competitor, Akers said, because of such recent moves as the major reorganization of U.S. business units, cuts in overhead and recently announced investments in Metaphor Computer Systems and Steve Chen's Supercomputer Systems, Inc.

In response to a stockholder's question, Akers said MCI Communications Corp. executives plan to buy back IBM's 16% stake in MCI, and Akers said he expects that buy-back "will come to pass over the next few years."

Abandon right to sue directors

In a shareholder resolution presented at the meeting, IBM stockholders voted to give company directors some protection from personal financial losses imposed by stockholder lawsuits. By approving the amendment, IBM shareholders gave up the ability to sue directors for negligence in performing their fiduciary duties.

IBM said the amendment to its certificate of incorporation in New York state is necessary because of an increasing num-



You Take The Spotlight,

While you are out in the spotlight giving it your all, you can't afford to worry about your communications network support.

At Tymnet McDonnell Douglas, worry-free service is our specialty.

We have two decades of experience — we were the first public data network, in fact, and are one of the world's largest private network suppliers — helping large and small corporations and government agencies to take the spotlight by offering cost-effective, comprehensive, reliable communications services, so they can concentrate on their businesses rather than on networking worries. For hundreds of Fortune 500 companies and government agencies, we offer:

- maximum flexibility, with a software-based approach that enables simple, inexpensive upgrading and modification; unmatched protocol conversion capabilities; and the largest variety of dial-up access speeds (up to 9600 bps)

INTERNATIONAL
COMMUNICATIONS
ASSOCIATION
TYMNET/ICA BOOTH #2080

ber of shareholder lawsuits that could be financially devastating to outside directors.

A real liability

IBM management argued that the prospect of personal liability makes it hard to attract and retain qualified directors. Compounding the problem is the increasing difficulty and expense of obtaining directors' liability insurance, the company added.

IBM's proxy statement noted that the action was not prompted by any specific lawsuit or complaint against IBM. The liability amendment was approved by the overwhelming vote of 458 million to 16 million.

In other business, shareholders defeated an anti-apartheid resolution sponsored by church and civil rights groups that would have stopped all sales and service of IBM products in South Africa.

> AKERS SAID IBM no longer has assets, equity or employees in South Africa.

Proponents said that IBM products are used primarily by that country's ruling white minority.

Although it was defeated, the proposal gained almost 10% of the shareholders' votes — about twice the amount of support expressed for a similar measure in 1987.

Last year, IBM sold its South African subsidiary to an independent company that sells and services IBM and other computer products. Consequently, Akers said, IBM no longer has assets, equity or employees in South Africa.

It would have been an "empty gesture" to sell the company and then stop supplying it with IBM products and services, Akers said.

Resolutions defeated

In addition, the shareholders soundly defeated the following special-interest resolutions:

- A proposal that would have banned all corporate payments, such as employee health benefits, that subsidize abortions.
- A proposal requiring IBM to provide details about its use of live animals for research and product testing.
- A proposal forcing IBM to publish details about any political campaign contributions.

A regular quarterly dividend of $1.10 per share was announced at the annual meeting, which was attended by 1,444 stockholders.

IBM also announced the promotion of Carl J. Conti to IBM senior vice-president.

Conti will continue to manage the IBM Enterprise Systems Division. James A. Cannavino was named an IBM vice-president; he will continue to head the Data Systems Division.

Micom

CONTINUED FROM PAGE 69

lan is an Ethernet-based LAN company with some Transmission Control Protocol/Internet Protocol expertise. Black Box is a catalog mail-order business for data communications equipment. Spectrum Digital manufactures T1 multiplexers.

The canceled buy-back bid, which attracted the proposals now under consideration, was for 4.8 million shares of Micom stock at $16 per share. Micom had already agreed to purchase about 4.2 million more shares owned by its three major stockholders, who are also dissident board members, for the same price. That agreement is now void.

Micom, which declined to identify its would-be buyers, said it was offered prices in excess of the current market value of the company. Micom was trading at around $13.50 per share at the time of its announcement, but jumped 2⅝ points to the buy-back offer price of $16 in heavy trading on the day of the announcement.

Micom's investment bankers, Volpe & Covington, had told Micom's board it considered the $16-per-share offer "fair to Micom from a financial point of view." But one financial analyst who follows the company termed the offer "outrageous."

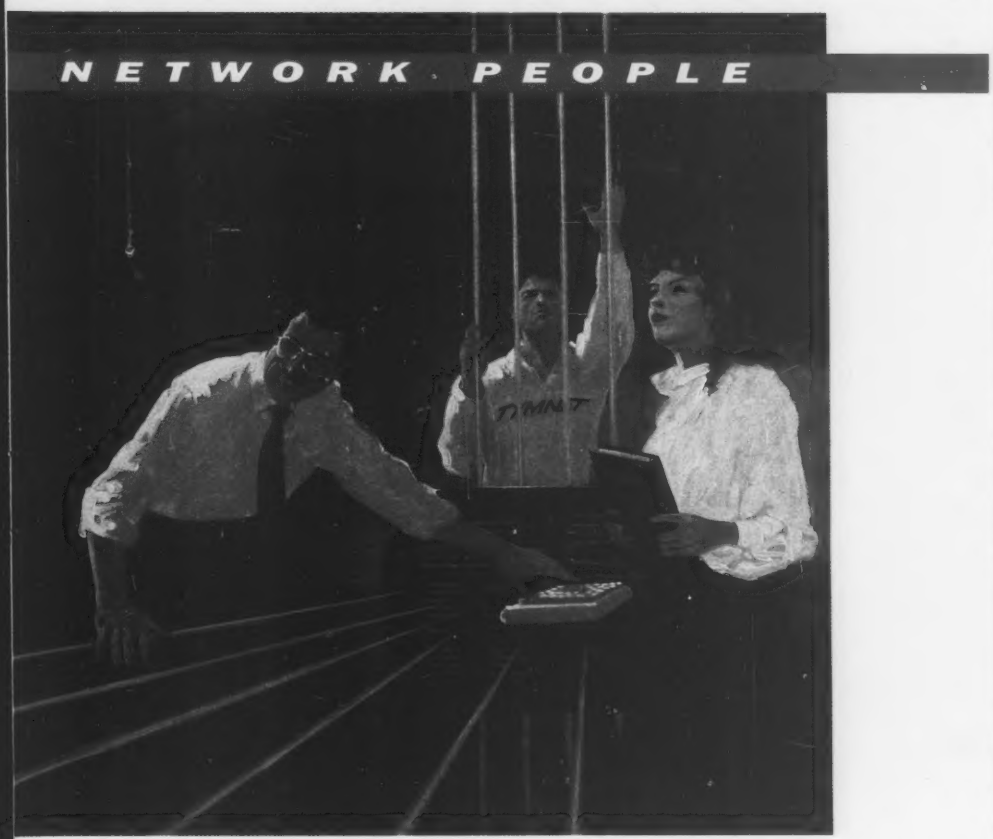
Analysts said Micom's management wanted to remove board member and founder William Norred and board members Sally and John Thornton because of their outspoken criticism of the firm, and was willing to pay $16 per share to do so.

Stockholders unhappy

Although Micom's earnings more than tripled in fiscal 1988 to $9.8 million, the firm's stock price has not responded accordingly. "I know a number of heavy stockholders are unhappy with the performance of the firm," a source close to Micom said. "Thornton was [upset] at the company's performance. He's watching his millions go down the drain, and he can't do anything about it," the source said.

Micom has retained the investment banking firm of Goldman, Sachs & Co. to help the board of directors evaluate the current acquisition offers and any others that may be received. The company said a special board committee has been formed to "explore alternatives for maximizing stockholder values."

Analysts and a source close to Interlan said Interlan has been available for purchase for some time but has failed to attract any takers.



We'll Take The Worries.

- network management, including network monitoring, 24-hour customer service, and extensive nationwide local technical support
- unparalleled data security
- comprehensive network planning support for maximum communications effectiveness
- error-free communications

The Intelligent Network People at Tymnet have helped a cast of thousands to perform brilliantly. Take advantage of our experience; call and let us show you how we can help you to achieve worry-free communications.

Bring us behind the scenes with you . . . We'll make you a star.

Tymnet
2560 N. First Street
P.O. Box 49019
San Jose, CA 95161-9019

Call us at (800) 872-7654

We Build Networks.

MCDONNELL DOUGLAS

Wilder

CONTINUED FROM PAGE 69

meeting, IBM's Chick Hayden reaffirmed Big Blue's year-old practice of returning some of IBM Credit's used inventory to the IBM sales force rather than to the third-party market.

"Our traditional markets are becoming so crowded," said CDLA Chairman Bob Gulko, head of Unicom Computer in Sausalito, Calif. "Companies have to look at non-IBM business in a much more aggressive way."

What are the options? Leasing and brokering DEC equipment is the most obvious, and the DEC boom of the past two years has a lot of lessors eyeing the possibilities. But panelists at a CDLA session on the profit potential of DEC equipment described a mine field of a marketplace, thanks to DEC's aggressive posture against the secondary market.

"Not only do they have it now, but they want it all," said C. D. Smith, president of the 73-member DEC Dealers Association, which is not affiliated with the CDLA. "Initially, DEC needed help in the marketplace, but they have changed from open arms to total control."

Essentially, Smith observed, DEC's get-tough signal to add-on hardware makers in the form of closing the VAXBI bus has been paralleled by DEC's sales force offering deeply discounted VAXs to keep new accounts away from third-party used equipment dealers.

The going gets tough

Dave Harmon, chairman of the CDLA's fledgling DEC Relations Committee, was equally discouraging. Harmon's company, Sherman Oaks, Calif.-based El Camino Resources, has found rough sledding in its forays into the DEC market. "I've seen [DEC] cost themselves a million dollars going against one used CPU," he said.

Harmon is now seeking a high-level CDLA contact within DEC, an effort that began with a letter from Benton to DEC President Ken Olsen earlier this year. The CDLA is not happy with the level of contact DEC has offered so far, but will continue to push harder, Bouldin said.

Another major market CDLA hopes to unlock is the federal government, which currently operates under procurement guidelines that prohibit systems integrators from including used computers in their bids.

Although profit margins in leasing are getting tighter, the business itself is growing, and very few lessors are headed for the poorhouse. It's just a much tougher business to compete in now, and with increasingly sophisticated lessees willing to shop for bargains, that competition can only get more intense. The CDLA faces crossroads not only in finding new markets, but also in diligent self-policing of the business practices of fierce competitors. The industry could ill afford another OPM or Itel-like scandal now.

Wilder is *Computerworld's* senior editor, computer industry.

Kavner

CONTINUED FROM PAGE 69

nology within many corporations.

"More and more, it is end users who are deciding what applications should be run," he said. "MIS managers — at least the good ones — are acting as a conduit for this."

Kavner said he intends to begin visiting customers and value-added resellers next week to reassure them of his commitment to the computer industry. He faces a skeptical reception by those who have seen a parade of four executives before him — Archie McGill, Jack Scanlon, James Edwards and Cassoni — making similar promises. Moreover, new AT&T Chairman Robert Allen is not believed to have the same emotional tie to the computer business as his predecessor, the late James Olson.

AT&T recently said it would not increase its stake in Olivetti and is believed to be unhappy with the Italian company's progress in marketing its telecommunications gear in Europe.

Olivetti, on the other hand, is thought to be miffed by AT&T's inability to sell its microcomputers effectively in this country, outside of its Intel Corp. 80386-based machine.

Moreover, Olivetti Chairman Carlo DeBenedetti is involved in a variety of business ventures and reportedly needed Cassoni back at Olivetti to tend to daily operations at the $6 billion company.

Bart Stuck, an analyst with telecommunications market research firm Probe Research, Inc., said the odds on AT&T's remaining in the computer business are still 50-50.

"There's no amazing technology to make them successful; there's no pulling a rabbit out of a hat to prevent them from failing," Stuck said.

"Kavner's made a strong commitment to the business; I don't see why he can't break even by the 1989 to 1990 time frame, based on the strategy that is already in place," he said.

Field Service Management Systems

Putting one on-line takes over 100 man-years and 3 million lines of code.

Automating customer service can be a major programming challenge. So if you have enough challenges, look into FIELDWATCH™ software—the world's leading system for the support and management of service organizations.

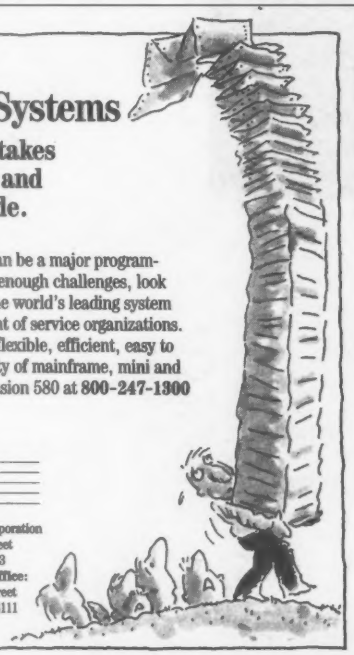
FIELDWATCH software. It's flexible, efficient, easy to implement, and runs in a variety of mainframe, mini and micro environments. Call extension 580 at **800-247-1300** (617-272-4100 in Mass.).

FIELDWATCH

THE DATA GROUP CORPORATION

A BYTEX Company

The DATA Group Corporation
77 South Bedford Street
Burlington, MA 01803
West Coast Sales Office:
1750 Montgomery Street
San Francisco, CA 94111



Foreign sales

CONTINUED FROM PAGE 69

market, which still offers room for expansion."

Other companies reporting results included the following:

Compaq. Continued acclaim and purchases of its line of Intel Corp. 80386-based PCs helped the Houston-based company continue its astronomical growth rate. Both revenue and net income more than doubled over year-earlier results.

"They simply blew away my estimates," First Boston's Wolf said. "Their international sales continued very strong, and I feel they can sustain a 30% to 40% international growth rate over the next year. IBM's high-end Personal System/2 Model 80 still has not hurt Compaq. I'd say they have a good shot at reaching $2 billion in sales this year."

Stratus Computer, Inc. The introduction of low-cost entries to its line of fault-tolerant computer systems helped the Marlboro, Mass., vendor continue its recent strong growth with healthy gains in both revenue and net income over year-earlier results.

In addition, the company benefited from the Big Blue shadow across its doors. "Their OEM relationship with IBM is building, and I think that's what we're seeing here," said Melinda Reach, vice-president of research at Merrill Lynch & Co. "IBM is a big customer that has increased their shipments sharply. That's a lot to get for a small company such as Stratus."

Tandem Computers, Inc. A healthy sales clip in Tandem's international sector helped shine up lackluster domestic figures and keep profits growing at a respectable 26% over the year-earlier quarter.

"Tandem has seen a slowdown in the spending for high-end systems by big U.S. customers like the brokerage houses, but their international sales have been extremely strong, growing more than 50% in the quarter. I think this is the area they'll be concentrating on," said Lawrence M. Harris of Bateman, Eichler, Hill Richards, Inc.

Revenue growth for the Cupertino, Calif., maker of on-line transaction processing systems was also bolstered by sales from the recently acquired Integrated Technologies, Inc. and Ungermann-Bass, Inc. The two companies together contributed more than $13.5 million to quarterly revenue.

Control Data Corp. The Minneapolis-based company continued to experience problems — a slackening of sales in the Computer Systems and Services Group helped create only modest revenue growth — and Chairman and Chief Executive Officer Robert M. Price promised more of the same.

"With stronger selling efforts in 1988, Control Data should achieve improved revenue growth and earnings, but we do not anticipate significant profit growth, however, until the latter half of 1988," he said in a statement.

But some analysts were more optimistic about CDC. "Their ETA supercomputer will start to ship in volume this year, and when it picks up steam, we'll begin to see a lot more revenue for the company," said Gerard F. Hallaren, vice-president at Smith Barney, Harris Upham & Co.

Hogan Systems, Inc. Chairman and Chief Executive Officer Gary W. Fiedler blamed accounting changes and an increase in expenses related to software development as contributing to a 66% drop in net income and a 12% drop in revenue over year-earlier results.

For the fiscal year ended March 31, Hogan's earnings before extraordinary credits plunged 81% from $5.2 million to $1 million. Total revenue fell from $48.3 million to $46.7 million, but revenue from new software licenses fell significantly by 19% to $15.4 million.

Management Science America, Inc. After completing a difficult 1987 that included staggering losses due to accounting changes, MSA posted a small rebound in the first quarter. The Atlanta-based mainframe applications vendor earned $2.4 million, or 14 cents per share, on revenue that climbed 18% to $62.9 million. Revenue from new software licenses also rose 18% to $28.6 million. In the year-earlier quarter, MSA lost $2.3 million from operations but added a $69.9 million loss from accounting changes.

Computer Sciences Corp. The systems integrator reported a successful fourth quarter and fiscal year. For the year, profits rose 35% to $43.5 million on a 12% revenue gain to $1.15 billion. Fourth-quarter earnings were up 28% on a 6% gain in sales to $309.1 million.

1988 Computerworld SPOTLIGHT Sections

Issue Date	Spotlight Topic	Ad Closing	Trade Show Distribution
Jan. 11	Terminals & Terminal Emulation Products	Dec. 24	
Jan. 25	LANs	Jan. 8	Communication Networks
Feb. 8	DEC-compatible Software	Jan. 21	Uniforum
Feb. 29	Performance Management/ Capacity Planning	Feb. 12	
Mar. 14	DBMS	Feb. 26	
Mar. 28	Micro-to-Host Links	Mar. 11	WCC/Interface
Apr. 11	PCs (IBM-compatible)/ Portables/Laptops	Mar. 25	
Apr. 25	Electronic Publishing	Apr. 8	
May 9	Printers	Apr. 22	Comdex Spring
▶ May 23	Data Communications	May 6	
June 6	CASE	May 20	
June 20	The SNA Market	June 3	PC Expo
July 11	Disaster Prevention & Recovery Products & Services	June 24	
July 25	Productivity Software	July 8	
Aug. 8	TBA	July 22	
Aug. 29	DB2 Market	Aug. 12	
Sept. 19	Hardware Roundup: Large, Medium Scale & Special Purpose Systems	Sept. 2	
Sept. 26	Hardware Roundup: Small Scale Systems	Sept. 9	TCA
Oct. 3	Hardware Roundup: Personal Computers & Workstations	Sept. 16	
Oct. 17	AI/Expert Systems	Sept. 30	Dexpo West
Oct. 31	Unix	Oct. 14	
Nov. 14	TBA	Oct. 28	Comdex Fall
Dec. 5	LANs	Nov. 18	
Dec. 19	IBM-compatible PCs/PS2 Market Products/Monitors	Dec. 2	

YOUR BEST BUYING GUIDE FOR PRODUCTS AND SERVICES IS RIGHT HERE.

IN COMPUTERWORLD SPOTLIGHT

Evaluating and specifying products and services for purchase is no easy task. And it's even more difficult when new products and vendors are frequently entering the market. But *Computerworld* makes the buying process easier for you with *Computerworld* Spotlight.

Spotlight is a series of pullout sections within *Computerworld*, each focusing on one product category. With 24 Spotlight sections in 1988, you'll get the purchasing specifics you need for PCs, LANs, printers and productivity software — to name just a few. Each Spotlight contains quick reference specification charts that compare products on a feature-for-feature and dollar-for-dollar basis. Plus related editorial on real-life applications, interviews, vendor viewpoints and market trends. And since it's a pullout section, you'll be able to save and refer to this information as you need it.

If you're involved in buying products, *Computerworld* Spotlight is the section you'll be turning to throughout 1988. And if you're marketing computer products in any of the Spotlight categories covered, you should be putting your message where your market is. Our schedule of 1988 Spotlight topics is listed at the left for your reference.

COMPUTERWORLD

An IDG Communications Publication

The education of an expert

Four examples show the path to guru status can be unpredictable

BY ALAN RADDING
SPECIAL TO CW

There is a joke that describes a computer consultant as any professional in the industry who has been out of work for three months.

That may be an exaggerated characterization, but circumstance seems to have played a role in the career paths of some leading authorities on the use of information technology, particularly in the microcomputer arena. Some experts offset a lack of extensive technical training by taking advantage of their general analytical ability.

Computer consultants can be divided into four categories: analysts, implementers, researchers and commentators.

In general, analysts study new technologies and develop strategic implementation plans. Implementers help launch new technologies. Researchers track and analyze market data. Commentators develop a broad overview and provide insights into directions and trends.

Patricia Seybold, president of Patricia Seybold's Office Computing Group in Boston, is an analyst. "I got my start through nepotism," she quips. Seybold went to work for her father and brother, both industry analysts. As office automation emerged as a distinct field, she decided to follow it. "I started with word processing, which evolved into office automation," she says.

Liberal arts valuable

Except for a brief stint shuffling data processing punch cards at a bank, Seybold lacks a technical background. "I got my degree in comparative literature. It taught me how to analyze," she says.

Becoming a top consultant was not difficult, because the field was moving rapidly. "You didn't have to have a lot of background. You had to be able to ask intelligent questions," Seybold says.

Shaku Atre is an implementer. After 14 years in a variety of technical areas at IBM, she left to establish Atre International Consultants in Rye, N.Y., now known as Atre Computer Assistance.

Atre believes the key to her success is her hands-on IBM technical experience, which she says gave her a good grasp of the technical details. "I reached the stage where I could solve [technical] problems over the phone," Atre recalls. "You cannot talk about a product unless you work with it."

But IBM experience alone does not account for achievement as a consultant. "You must go beyond your job. You must create opportunities," she says.

While at IBM, Atre published a book on data base design that attracted her first client, AT&T, and she taught at local universities.

Her published works and teaching experiences are the foundation for the 50 courses and seminars she now leads.

JoeAnn Stahel is a researcher. A founder and principal of Storeboard, Inc., a Dallas-based research firm that tracks computer sales through specialty stores, she says she cannot quite believe she is a frequently cited authority.

In 1981, when she received a master's in education after raising several children, she set off to pursue a career in education. She focused on educational testing and measurement, which provided her with the statistical skills she now applies to her computer industry research.

The personal computer explosion in 1983 got her hooked on computers, and she landed a job at Future Computing, Inc., a large computer industry research firm. When the PC industry slumped in 1985, she left Future Computing and helped set up Storeboard.

When people think of the ideal systems consulting job, John Connell's probably is what they imagine. Connell serves as a commentator as executive director of the Office Technology Research Group (OTRG) in Pasadena, Calif., which he founded 11 years ago. Prior to that, he spent 15 years at Atlantic Richfield Co. He got started in the computer industry at Burroughs Corp. in 1955.

OTRG is a computer systems think tank. Through it, the top computer managers of member companies meet twice a year to discuss future trends and directions. Connell sets the agenda, leads discussions, writes extensively and publishes OTRG's newsletter.

He believes there are great opportunities for new consultants in mastering new technologies and helping companies develop and implement OA programs. "I think there is a marvelous opportunity in the integration of image processing with DP," he suggests.

Seybold agrees. "The field is far from saturated," she says. "There is a big need for implementation consultants. There are millions of PCs, and there is a lack of infrastructure to manage them. Companies don't have the manpower for project planning."

FOCUS ON A SPECIFIC area, preferably an emerging technology. Pick the type of role suited to your abilities. Gain exposure by getting published and cited in publications. And be willing to take risks.

Top dollars for top talent

These opportunities can provide good money for top prospects. Large consulting firms pay new recruits with an MBA from a leading school salaries of up to $70,000. Salaries for experienced management consultants regularly top $100,000. Of course, a lone consultant, starting out on his own, probably will not earn that kind of money.

There are other rewards, a "personal return," as Connell says. "I enjoy operating in a much broader arena than I did when working for one firm."

So you want to be a consultant? Here are some tips from the experts. Focus on a specific area, preferably an emerging technology. Pick the type of role suited to your abilities (implementers and analysts are in the greatest demand). Gain exposure by getting published and cited in publications. And be willing to take risks.

Radding is a Boston-based author specializing in business and technology.

AGS knows...
the importance of a challenging career.

Founded 20 years ago, AGS continues to work on major projects that utilize the latest in UNIX* and IBM technologies. We are a $500 million public corporation (NYSE:AGS) employing 1800 computer professionals in 33 offices nationwide.

Project Managers/Analysts/Programmers

Immediate opportunities are available throughout the U.S. for individuals with 2 years experience in any of the following:

IBM		UNIX
☐ DB2		☐ Informix
☐ PL/1 Applications		☐ Internals
☐ IMS	=	☐ Sun Workstations
☐ VTAM	=	☐ Communications
☐ Systems Programming		☐ 'C'

For consideration, please call our 800# or send your resume in confidence to:

Donna C. Bancala, National Recruiting, Dept. CW04
AGS Information Services, Inc.
1139 Spruce Drive
Mountainside, NJ 07092

1-800-HIRE-AGS

AGS

Equal Opportunity Employer M/F
*UNIX is a trademark of AT&T

For 22 Years We've Hired the Best...
Did We Miss You?

We are **Automated Concepts Incorporated (ACI)**, a leading consulting and software development company. For 22 years we've hired the industry's most talented people to build systems. Our continuing success has produced additional career opportunities in Chicago, Los Angeles, New Jersey, New York and Washington, DC for professionals with experience in:

• COBOL or PL/1	• UNIX®
• CICS	• C
• DB2	• ASSEMBLER
• IMS DB/DC	• ADA
• IDMS	• ORACLE
• ADABAS/NATURAL	• INFORMIX
• MODEL 204	• TANDEM

In addition to our highly competitive salaries, ACI offers medical, dental, life and disability insurance; 401(K) plan; paid vacations; tuition reimbursement, internal and external training in leading technologies.

Call COLLECT (212) 725-4540 OR send resume with salary requirements and location desired to:

National Recruiting Office – Attn: Lisa Semmes CW 52

Automated Concepts Incorporated
386 Park Avenue South
New York, NY 10016

aci automated concepts incorporated

®UNIX is a trademark of AT&T Bell Laboratories — equal opportunity employer m/f

DATA PROCESSING

Sr. Programmer Analysts

An unique opportunity exists to join the world's largest winery in responsible career growth positions offering an excellent salary with career stability, company paid fringe benefit program and ideal living conditions in a nonmetropolitan area 90 miles from San Francisco.

The individual will participate in the development of a variety of management support systems. A Bachelor's degree in Computer Science, Business or related field is preferred. Requires five plus years in MIS with two plus years in an MVS/XA, DB2, SQL environment. Desire experience with Sales/Marketing systems,4GL's, Data Communications, Graphics; and, development experience on IBM PC's. Also of interest: college-level math, including multi-variate analysis; SAS, SPSS and simulation tools; good applications background in distribution, finance or logistics systems. Must be self-motivated, require little supervision and be an effective communicator.

Please send resume and salary history, in complete confidence, to:
Professional Staffing Department,
E. & J. Gallo Winery,
P.O. Box 1130,
Modesto, CA 95353.

E. & J. GALLO WINERY

An equal opportunity employer. M/F/H.

ATTENTION:

DB2, CICS, ASSEMBLER, And C Programmers

Develop Tomorrow's Leading Products Today

Ten years ago, Compuware introduced Abend-AID® and helped change the way programs are debugged at over 4500 IBM mainframe sites worldwide. Since then, Compuware has introduced more products that continue to set software standards, keeping us at the forefront of programmer productivity tool developments. Compuware is now one of the world's largest independent software providers.

Today, Compuware needs 40 experienced software developers and product implementation specialists to bring exciting new products to market . . . products that will help shape testing and debugging standards for the 1990's!

If your background includes extensive DB2, CICS, IMS, ASSEMBLER, C, PL/1, or Systems Programming, come explore our systems software opportunities.

Compuware can challenge, motivate and reward the brightest and best programmers with 40 of tomorrow's best career opportunities.

To learn more about how you can help set tomorrow's standards, let us hear from you soon. Please send resume and salary requirements to Richard McAteer, Compuware Corporation, Department R, 31440 Northwestern Highway, Farmington Hills, MI 48018-5550. 1-800-521-9353

COMPUWARE
Because experience is everything.

An equal opportunity employer

Abend-AID is a registered trademark of Compuware Corporation.

KENDA SYSTEMS, INC.
Boston • New York • Washington

SOFTWARE CONSULTANTS

KENDA SYSTEMS provides consultants to the East Coast High Tech Community. Talented professionals who take pride in their work are welcome to register with KENDA SYSTEMS.

Current Requirements include:

* DATABASE:	VAX/VMS/RELATIONAL DB DESIGN
* DRIVERS	VAX/VMS (I)/MACRO-32 AND C
* PAD:	VAX/VMS/C/X.25
* PORT:	CONTROL SYSTEMS PORT MS-DOS TO XENIX
* SYSTEMS DESIGN:	VAX/ASM/68000/ STRUCTURED DESIGN
* QA:	NETWORK TESTING/ X.25/SNA
* COMMUNICATIONS:	C/TCP IP/INTERFACE
* GRAPHICS:	UNIX/C/68000/ WORKSTATION SOFTWARE
* DIAGNOSTICS:	RSX/UNIX/C
* TEST:	PC AND MAINFRAME FOCUS SYSTEMS
* TECH-WRITER:	USER MANUALS/C LANGUAGE

Forward resume to D. Sierra.

2 Manor Pkwy., Salem, NH 03079 (603) 898-7884

Project Options

Hundreds of national assignments are now available with just one call. Choose your location and enjoy the security of an active career that combines rewarding state-of-the-art projects with the option of travel and adventure.

THE NATIONAL PROJECT CENTER

If you are an expert in any of the following areas, explore your options:

ADABAS	CICS/DL1
PMS	ORACLE
DB2/SQL	DB2/DBA
FOCUS	IDMS/DBA
PL1/CICS	IDMS-ADS/O
PL1/IMS	IBM PS2-"C"
PL1/ASSEMBLER	IMS DB/DC
PL1/ADF	EXEC/REXX

Put your future to work today, call 1-305-PROJECT, or write: National Project Center, 4401 W. Tradewinds Avenue, #302, Lauderdale by the Sea, FL 33308.

The Experts — An Equal Opportunity Employer

PERMANENT AND/OR CONSULTING POSITIONS

DEC
- Programmers–VAX, VMS BASIC
- Systems Prog'rs-VAX, VMS, BASIC

HONEYWELL
- Prog'rs-GMAP, GCOS, 3 or 8

IBM
- Prog'rs-COBOL, CICS, PL-1
- Commun Spec.-CICS, TCAM

Please call 212-684-3950 Or Submit Resume to:

HANK WALSH ASSOCIATES
475 Fifth Ave, NY, NY 10017

DATA PROCESSING PROFESSIONALS

We speak your language!

Yes, there are recruitment people who know the workings of the computer field, who concentrate on understanding your needs...and filling them.

Through our national network, these specialists can scour the country to find the one best candidate for your company's opening. If you hire at the middle management or executive level in the computer field, get to know us better.

Independently owned and operated offices in major cities. For the office specializing in your area, call toll free: (800) 221-4864. (In NY State, call 212-697-4314.)

Fortune Personnel Consultants

Software Analysts

In This Real-Time Environment The Opportunities Are Happening Now.

If you're in communications, you know it's the right time to be at Contel Technical Services, a division of the $3-billion Contel Corporation. Right now, we're developing the most advanced Satellite Communication System—the Tracking and Data Relay Satellite System (TDRSS)— to keep NASA in touch with the Space Shuttle and low-orbiting satellites at our technologically advanced facilities in beautiful Las Cruces, New Mexico.

Programmer/Analyst UNISYS Mapper

To qualify for this project leader position, you'll need 4 years' experience in database design and systems development using UNISYS MAPPER, as well as a Bachelor's degree in Computer Science, Business, Business Systems, or a related field.

Configuration Management Analyst

We require 2-4 years' programming and system management experience in a UNIX™ operating system environment. Additionally, a background in developing/maintaining automated configuration management or database management systems/tools for distributed systems is essential.

Our environment consists of UNIVAC 1100, DEC PDP 11/70, MicroVAX, HP Systems and Masscomp (M68020), all running real-time operations using a variety of languages (FORTRAN, JOVIAL, C) and operating systems.

For an opportunity to be at the forefront of communications technology, contact Contel now. In addition to an exciting career and lifestyle, you'll enjoy competitive salaries and a flexible benefits program. Please send your resume to Stefan Sutherin, Contel, P.O. Box 235, Dept. CW, Las Cruces, New Mexico 88004. Minorities and females are encouraged to apply. U.S. citizenship required. Equal opportunity employer m/f.

UNIX is a registered trademark of AT&T Bell Laboratories

CONTEL Technical Services

PEOPLE IN TOUCH WITH TECHNOLOGY

THE TRACK...

doesn't get any faster than this.

PROGRAMMERS/ANALYSTS

CSX Technology is proud of its reputation of leadership. With the strength of the multi-billion dollar giant CSX Corporation behind us, we've become the most sophisticated, advanced information management organization in the U.S.

Success breeds success. We believe in developing the talents of the most ambitious data processing professionals we can find. We are currently seeking **PROGRAMMERS/ANALYSTS** with at least 2 years experience in any of the following skills:

- **DB2**
- **ADABAS/NATURAL**
- **VAX/FORTRAN**
- **IMS DB/DC**
- **BURROUGHS A SERIES**

CSX is called on for a wide array of services: systems review/planning, hardware/software analysis, software design, systems implementation/documentation, and personnel training. You'll work in our client offices, on short term or long assignments. At CSX Technology, you'll be challenged on the job, recognized as a professional, and experience variety other companies simply can't match. In addition, CSX provides above industry salaries and exceptional benefits.

If you like the idea of moving forward faster, CSX Technology could be for you. For more information, **CALL Rusty Cain at (904) 632-8147 or send your resume to: CSX TECHNOLOGY, 550 Water Street, Suite 500, Jacksonville, FL 32202.** Equal Opportunity Employer.

CSX TECHNOLOGY

Your Future. CSX Technology. The Best Meets The Best.

SENIOR PROGRAMMER/ANALYST FINANCIAL COMPUTING UNIVERSITY OF HOUSTON-CLEAR LAKE
****SEARCH RE-OPENED****

The University of Houston-Clear Lake is seeking a versatile individual to assume the senior role in programming, analytical, and support activity for the Administration and Finance Division. *** Computing environment consists of VAX 8700-8250 Cluster running VMS and Oracle on an Ethernet Lan with varied DEC stations and IBM-PC's/compatibles; telecommunications with University of Houston Central System; access to state and national networks. Major software conversions form Honeywell to VAX are now underway. *** In-depth programming and analytical experience in all stages of feasibilities, requirements, design, development, testing, implementation, documentation and support necessary. Position requries performance in development, and/or team leader role as expertise matches the excelling computing needs in the Administration and Finance Division.

*****QUALIFICATIONS*****

Education: * Bachelor's degree in Computer Science or equivalent, or a minimum of three years in-depth programming and analytical experience.
Experience: * Two years of comprehensive software development, analytical, and support experience as programmer/analysts, using COBOL, Fortran, or Pascal language. Two years software development in VAX VMS environment. One year developing data base applications.
Preference: * Oracle relational data base experience. Experience in administrative/financial environment beneficial.
Salary: * Minimum salary in high 20-s, commensurate with skill level and qualifications.
Closing Date: * May 20, 1988
Applications: * Chairperson for Sr Programmer/Analyst Search Committee, University of Houston-Clear Lake, 2700 Bay Area Blvd, Box 230, Houston, Texas 77058

An Equal Opportunity, Affirmative Action Employer

1000 DP Opportunities

TANDEM Progr/Anal.	27-38K
TANDEM Sys Prog.	35-45K
System 38 Progr/Anal.	27-33K
VAX Progr/Anal.	28-38K
DB2 - SQL Progr/Anal.	38-48K
ADABAS/NATURAL Progr/Anal.	28-38K
IMS DB/DC Progr/Anal.	28-38K
CICS Progr/Anal IDOS or MVS	27-35K
IDMS ADSO Progr/Anal.	27-35K
ASSEMBLER Programmer	27-35K
McCormick & Dodge Progr/Anal.	38-48K
MSA Progr/Anal or Sys Anal.	38-48K
Hospital Progr/Anal IDOS/CICS	28-33K
Retail Progr/Anal MVS/CICS	27-33K
Bank Progr/Anal ICICS or IMS	27-38K
Manufacturing Progr/Anal ICICS	28-35K
Distribution Progr/Anal ICICS	27-33K
Insurance IPMS Progr/Anal.	38-45K
LIFE/COMM. LIFE/70 Progr/Anal.	38-45K
Data Base Anal IMS or DB2	40-55K

What do **you** want? A better **opportunity**, a more **challenging** position, a change in **geographical location**? Largest employment agency in Charlotte, in business since 1975. 150 affiliates. Fee paid.

Corporate Personnel Consultants
3705-339 Latrobe Dr., Charlotte, NC 28211
(704-366-1808)
Rick Young, C.P.C.

SYSTEMS ANALYST/COMPUTER ENGINEER; 40 hrs/wk; 8 am-5pm; $28,650/yr. Job requires masters in computer engineering. Job also requires: 1) Undergraduate degree in electronics/electronic engineering; 2) 1 grad course in mini & micro computers; 3) 1 grad course in design of digital systems; & 4) 1 grad course in design computer language. Job duties: develop software for microprocessors for a variety of projects in manufacturing or business environments. Analyze processor chip to assure compatibility with peripheral hardware. Write computer codes in ASSEMBLY language. Modify computer codes using appropriate high level computer language. Set up programs inside processor chip. Design digital system for a variety of projects in manufacturing or business environments. Test & debug newly developed system. Qualified applicants should send resume & verification of requirements to 7310 Woodward, Rm. 415, Detroit, MI 48202. Ref#25488. Employer Paid Ad.

The Finest Source of EDP Professionals in Northern California

For over 15 years the best companies have relied on CRG to find superior data processing professionals to meet their needs.

Give us a call or mail your resume today to find out what we can do for you. 303 Sacramento Street, San Francisco, CA 94111, (415) 398-3535 -OR- 3060 Olcott St., Suite 130A, Santa Clara, CA 95054, (408) 727-1638.

The Computer Resources Group, Inc.

An Affiliate of National Computer Associates

Project Manager/Computer Systems Analyst wanted to design, develop, enhance and implement a Burroughs Advanced Manufacturing Control System (BAMCS); support modifications and installation of an integrated manufacturing distribution and accounting systems; technical consultancy to marketing organization; manage and implement large systems conversion projects; use Burroughs "A" series, B6000, UNISYS 5000/7000, BAMCS, MCBA software packages, systems conversion methodology, LINC, DMS II, COBOL, CANDE, Word Flow language, ERGO and ALGOL; requires Bachelor's degree in Electronics & Communications Engineering or Computer Engineering and two years experience; $35,000.00 per year; 40 hours per week. Send resume to 7310 Woodward Ave., Room 415, Detroit, MI 48202. Ref. #24988 "Employer Paid Ad"

DMS SPECIALIST (PROGRAMMER ANALYST): NYC. Work on batch & on-line Welfare Mgmt syst for govt'l agency to provide for validation of new applicant's eligibility for benefits, a history of benefits rec'd & reporting & issuing of benefits. Write an interface to other syst's; produce/control batch schedules; design/write & approve them. Train users in technical procedures, coord production/control. Must know Sperry 1100 DB Mgmt syst software, OS 1100, DMS util, MAPPER, TIP/CMS, COBOL, MASM, db mgmt & reorganization util & db admin. Use Sperry 1100 hardware. Req: 3 yrs exp or 3 yrs rel exp - programming position util DMS - SPerry 1100. $36,522/yr, Mail resume only, in dupl, to : RVB#224, RM 501, One Main St, Bklyn, NY 11201.

TEXT ANALYST/PROGRAMMER

Charlottesville, VA based law publishing subsidiary of Macmillan, Inc. has an opening for an analyst/programmer on its text team currently continuing development of a sophisticated electronic database publishing system.

This position requires hands-on experience (2+ years) with IBM mainframes running MVS, PL/1, VSAM and CICS. Experience with "C", IBM PC's and electronics input/output techniques is highly desirable. A Bachelor's degree or equivalent is also required.

We offer excellent fringe benefits with starting salary at mid to upper 30's. Principals only reply with resume and salary requirements (only resumes with salary information will receive responses) to:

Vice President/Director of Administration
The Michie Company
P.O. Box 7587
Charlottesville, VA 22906

EOE *M/F*

IDMS Professionals

P/A ADS/O COBOL SEast.	$25-35K
S/A ADS/O MSA SEast	$40K
P/A IDMS COBOL WEast	$36K
S/A ADS/II Dbnet WEast	$47K
P/A ADS/O Convert. SWest.	$28-40K
P/A ADS/O COBOL WWest	$28-38K
Sr P/A ADS/O COBOL Tex.	$32-38K
DBA DB Des. ADS/O Tex	$50K
DBA Analy's./Des. SEast	$32-38K
DBA Supp. ADS/O COBOL WEast.	$35K
DBA Des./Internals WWest	$40K

CMA GROUP
7100 E. Belleview Ave. Ste. 14
Englewood, CO 80111
303-779-8890

LORIS DATA
1515 Route 10
Suite 1000
Parsippany, NJ 07054
(201) 540-8877

Loris Data is a full service Data Processing Organization who is dedicated to working with you and your staff on the successful implementation of application systems. Loris Data specializes in CICS, Systems and Design and offers Educational Workshops in CICS and Assembler as well as consulting services.

COMPUTER SALES

We are a small, aggressive, Inc. 500 IBM System/38 Value Added Remarketer (VAR) specializing in Credit Union Software. We sell nationally and internationally to growing Credit Unions.

We can offer you a choice of multi-state territories, a fast track to sales management, base salary, commission, accelerators, stock options, and fun.

You must be a quota breaker with mini-computer software sales experience. Paid relocation to the Washington, D.C., area is mandatory.

Please call me at (703) 448-9400 to discuss this opportunity. Ed Robinson

DEXEL SYSTEMS CORPORATION

PROGRAMMERS/ANALYSTS

SQL/DS CSP 5 Loc.	to mid 50's
Ethernet/Decnet NE	to 47K
VM Systems w/Telon NE	to 50K
UNIX Internals...NJ...	to 50K
CICS/DB2 TECH Support	OPEN
6100 DPPX CSP San Diego	OPEN
GCOS to MVS CONV .SE	to 50K
IMS DB/DC	OPEN
FOCUS 3 locations	to 40K
ADABAS 3 locations	to 40K
DATACOM/IDEAL 3 loc	to 40K
DB2/CSP	hi 30's
MSA Penn	hi 30's
HP POWERHOUSE	hi 30's
DMS2, DMIV, Thrift	mid 40's
VAX C MW Loc	hi 40's
VAX INGRES MPLS	OPEN
CASE TOOLS MPLS	OPEN
INFORMIX (UNIX) Denver	30's
IDMS ANALYST MPLS	OPEN
NOMAD VM/CMS SE	to 35K

John O'Brien, A&B PERSONNEL
122 BREMER BUILDING,
St. Paul MN 55101
(612) 293-0519

SR PROGRAMMER/ ANALYST

Rapidly expanding Midwest shop seeks 2 experienced COBOL Programmer/Analysts with solid IMS background. Must also have solid manufacturing development experience. Pluses are MRP and Bill of Materials Processing. This is a start-up position with lots of advancement potential. $40,000.

ROBERT HALF DATA PROCESSING
7733 Forsyth Blvd.
St. Louis, MO 63105
(314) 727-1535

SYSTEMS PROGRAMMER; Manhattan; maintain and upgrade computer system for property management and analysis using IBS and LOTUS 1-2-3. Prepare computerized bank applications for monthly advances on new projects, prepare controls and reports for three (3) major foundations and prepair computer and financial reports. Must have BS in business or management and 1 year experience. 35 hrs per/wk. M-F. $31,650. per/year. Send resume or letter in duplicate to: R.G. #248, Rm. 501, One Main Street, Brooklyn, NY 11201.

SYSTEMS PROGRAMMER

Baptist Medical System, the largest multi-unit healthcare system in Arkansas, has an immediate opening for a Systems Programmer. The successful candidate will have 3 years experience in SMF-E and OS Utilities with CICS, VTAM, NCP or MVS/XA or JES2 background. Degree is preferred. Hardware supported includes 3090, 4381, 3380, 3480, 3725 and 3274. Excellent benefit package. Salary commensurate with experience. Send confidential resume to:

Baptist Medical System
9601 I-630, Exit 7
Little Rock, AR 72205
(501) 227-2794
Equal Opportunity Employer m/f/h.

Anticipated Faculty Position (1-year appointment) in Mathematics and Computer Science. Ph.D. and teaching experience preferred; Master's Degree required. To teach upper-division mathematics and computer science courses. Salary: $25,000 thru $30,000, with benefits and possible summer teaching in 1988. Appointment begins August 24, 1988. Please send letter of application, vitae, list of graduate courses taken, and 3 current references to:

Dr. Daniel Jaeckle, Chair
Division of Arts and Sciences
University of Houston-Victoria
2302-C East Red River
Victoria, TX 77901

Deadline for application June 1, 1988.

An Affirmative Action/Equal Opportunity Employer.

FREE! 1988 Computer SALARY SURVEY

EXECUTIVE DIRECTIONS, INC.
Tech. & Sales Openings
2 Penn Plaza, Suite 1185
New York, NY 10121
(212) 594-5775

RSVP SERVICES
1 Cherry Hill Mall #614 (C1)
Cherry Hill, NJ 08002
(609) 667-4488 • (215) 629-0595

FLORIDA

Latin Travel

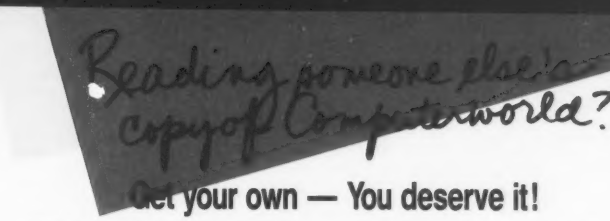
Fortune 100 Co. Travel To Mexico, Rio, Buenos Aires. Must Have MVS, COBOL, CICS & either DL/1 or IMS DB. $35,000

Russell Warner Associates
2203 North Lois Ave.
Suite 100
Tampa, FL 33607
(813) 870-8808

LOOKING?

Find the job you want in Computerworld's classifieds. No other publication carries as many ads for computer professionals as Computerworld, so no other publication can give you as wide a choice of jobs, salary and location as Computerworld. You can even try a "Position Wanted" ad to look for exactly what you want, where you want.

Be sure you look over our recruitment ads every week, so you don't miss the opportunity that's just right for you.



Get your own — You deserve it!

YES! I want my own subscription to COMPUTERWORLD. I'll pay just $44 for 51 weekly issues — that's only 86¢ per copy. In addition, I'll receive 12 FREE issues of COMPUTERWORLD FOCUS.

FIRST NAME M.I. LAST NAME

TITLE

COMPANY

ADDRESS

CITY STATE ZIP

Address shown: ☐ Home ☐ Business

For faster service call 1-800-255-6286! In NJ call 1-800-322-6286.

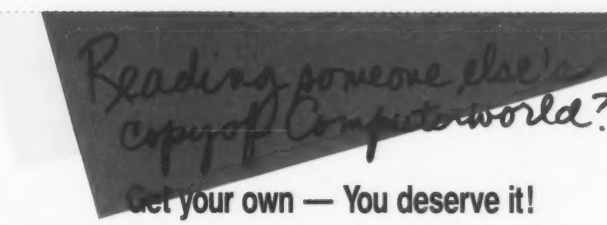
Canada, Central America & South America $110/Europe $165. All other countries $245 (Airmail). Foreign orders must be prepaid in U.S. dollars.

Please complete the information to the right to qualify for this special rate.

COMPUTERWORLD

1. BUSINESS/INDUSTRY (Circle one)
   - 10. Manufacturer (other than computer)
   - 20. Finance/Insurance/Real Estate
   - 30. Medicine/Law/Education
   - 40. Wholesale/Retail/Trade
   - 50. Business Service (except DP)
   - 60. Government — State/Federal/Local
   - 65. Communications Systems/Public Utilities/ Transportation
   - 70. Mining/Construction/Petroleum/Refining/Agric.
   - 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
   - 85. Computer & DP Services, including Software/Service Bureau/Time Sharing/Consulting
   - 90. Computer/Peripheral Dealer/Distributor/Retailer
   - 75. User: Other _____
   - 95. Vendor: Other _____ (Please specify)
2. TITLE/FUNCTION (Circle one)
   - **IS/MIS/DP MANAGEMENT**
   - 19. Vice President, Asst. VP
   - 21. Dir., Mgr., Suprv., IS/MIS/DP Services
   - 22. Dir., Mgr., Suprv., of Operations, Planning, Adm. Services
   - 23. Dir., Mgr., Suprv., Analyst, of Systems
   - 31. Dir., Mgr., Suprv., of Programming
   - 32. Programmer, Methods Analyst
   - 35. Dir., Mgr., Suprv., OA/WP
   - 38. Data Comm. Network/Systems Mgt.
   - **OTHER COMPANY MANAGEMENT**
   - 11. President, Owner/Partner, General Mgr.
   - 12. Vice President/Asst. VP
   - 13. Treasurer, Controller, Financial Officer
   - 41. Engineering, Scientific, R&D, Tech. Mgt.
   - 51. Sales/Mktg. Mgt.
   - **OTHER PROFESSIONALS**
   - 60. Consulting Mgt.
   - 70. Medical, Legal, Accounting Mgt.
   - 80. Educators, Journalists, Librarians, Students
   - 90. Others _____ (Please specify)
3. COMPUTER INVOLVEMENT (Circle all that apply) Types of equipment with which you are personally involved either as a user, vendor, or consultant.
   - A. Mainframes/Supermins
   - B. Minicomputers/Small Business Computers
   - C. Microcomputers/Desktops
   - D. Communications Systems
   - E. Office Automation Systems
   - F. No Computer Involvement

348818-6



Get your own — You deserve it!

YES! I want my own subscription to COMPUTERWORLD. I'll pay just $44 for 51 weekly issues — that's only 86¢ per copy. In addition, I'll receive 12 FREE issues of COMPUTERWORLD FOCUS.

FIRST NAME M.I. LAST NAME

TITLE

COMPANY

ADDRESS

CITY STATE ZIP

Address shown: ☐ Home ☐ Business

For faster service call 1-800-255-6286! In NJ call 1-800-322-6286.

Canada, Central America & South America $110/Europe $165. All other countries $245 (Airmail). Foreign orders must be prepaid in U.S. dollars.

Please complete the information to the right to qualify for this special rate.

COMPUTERWORLD

1. BUSINESS/INDUSTRY (Circle one)
   - 10. Manufacturer (other than computer)
   - 20. Finance/Insurance/Real Estate
   - 30. Medicine/Law/Education
   - 40. Wholesale/Retail/Trade
   - 50. Business Service (except DP)
   - 60. Government — State/Federal/Local
   - 65. Communications Systems/Public Utilities/ Transportation
   - 70. Mining/Construction/Petroleum/Refining/Agric.
   - 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
   - 85. Computer & DP Services, including Software/Service Bureau/Time Sharing/Consulting
   - 90. Computer/Peripheral Dealer/Distributor/Retailer
   - 75. User: Other _____
   - 95. Vendor: Other _____ (Please specify)
2. TITLE/FUNCTION (Circle one)
   - **IS/MIS/DP MANAGEMENT**
   - 19. Vice President, Asst. VP
   - 21. Dir., Mgr., Suprv., IS/MIS/DP Services
   - 22. Dir., Mgr., Suprv., of Operations, Planning, Adm. Services
   - 23. Dir., Mgr., Suprv., Analyst, of Systems
   - 31. Dir., Mgr., Suprv., of Programming
   - 32. Programmer, Methods Analyst
   - 35. Dir., Mgr., Suprv., OA/WP
   - 38. Data Comm. Network/Systems Mgt.
   - **OTHER COMPANY MANAGEMENT**
   - 11. President, Owner/Partner, General Mgr.
   - 12. Vice President/Asst. VP
   - 13. Treasurer, Controller, Financial Officer
   - 41. Engineering, Scientific, R&D, Tech. Mgt.
   - 51. Sales/Mktg. Mgt.
   - **OTHER PROFESSIONALS**
   - 60. Consulting Mgt.
   - 70. Medical, Legal, Accounting Mgt.
   - 80. Educators, Journalists, Librarians, Students
   - 90. Others _____ (Please specify)
3. COMPUTER INVOLVEMENT (Circle all that apply) Types of equipment with which you are personally involved either as a user, vendor, or consultant.
   - A. Mainframes/Supermins
   - B. Minicomputers/Small Business Computers
   - C. Microcomputers/Desktops
   - D. Communications Systems
   - E. Office Automation Systems
   - F. No Computer Involvement

348818-6

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 55 NEPTUNE, NJ 07754

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

CIRCULATION DEPARTMENT
P.O. Box 1565
Neptune, NJ 07754-9916

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 55 NEPTUNE, NJ 07754

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

CIRCULATION DEPARTMENT
P.O. Box 1565
Neptune, NJ 07754-9916

Programmers/Analysts

A JOB WELL DONE DESERVES A TRIP TO THE BAHAMAS

Paradise Island, Bahamas, to be exact. At IMI, we believe in rewarding a job well done. We have to. As a multimillion-dollar computer systems organization serving Fortune 500 companies and major Government agencies, we depend on the skills and dedication of our Programmers.

That's why we have rewarded our Achievement Club members with a trip to the beautiful Caribbean. And we'd like to congratulate all of last year's winners, too. You can really go places with IMI—this year Paradise, next year Puerto Rico. We're seeking individuals with at least 2-3 years' background in the following disciplines:

IMS DB/DC
PL1
COBOL
DB2 SQL/DS, CSP
RPGIII
UNIX™
INFORMIX

At IMI, we offer an extremely competitive compensation package including a 410K retirement plan, excellent training and outstanding career growth opportunities. Call or send your resume to one of our offices throughout the Northeast.

(212) 944-1555
IMI Systems Inc.
1500 Broadway
New York, NY 10036

(201) 292-9200
IMI Systems Inc.
One Gatehall Drive
Parsippany, NJ 07054

(201) 981-1898
IMI Systems Inc.
242 Old New Brunswick Road
Piscataway, NJ 08854

Direct applicant inquiries only. An equal opportunity employer.
Offices in: •New York •New Jersey
•Washington, D.C. •Dallas, Texas •London, England
UNIX is a registered trademark of AT&T Bell Laboratories

IMI SYSTEMS INC.
What's Good About Consulting Is Better At IMI

WANTED
Jugglers & Trapeze Artists

If you're an experienced Systems Analyst, Designer or Project Leader who can get into the swing of our clients' businesses and juggle several jobs at once, we'd like to audition you.

CGI Systems, Inc., the North American subsidiary of a leading international provider of CASE systems and consulting services, has several challenging positions open in our Professional Services area.

We need highly-motivated and talented individuals—people who work well without a net. In return, we'll give you the support of today's most sophisticated mainframe CASE development tool: PACBASE.

Systems Analysts & Designers– The successful candidate has 3-6 years experience designing & implementing mainframe applications using structured development techniques. Knowledge of COBOL and a mainframe CASE technology required, PACBASE a plus. Must be familiar with database and on-line systems.

Project Leaders– In addition to the requirements for Systems Analysts & Designers, the successful candidate for Project Leader has 6-8 years experience in progressively responsible MIS positions. Also, demonstrated project leadership skills, plus excellent oral and written communication.

In both positions, you'll be working on-site, designing and developing PACBASE systems for federal and Fortune 1000 clients throughout the U.S. and overseas.

PACBASE involves you in all phases of system design, development and implementation. It is a professionally-stimulating environment that lets you display your skills and be recognized for your achievements.

CGI Systems, Inc. offers an excellent salary and bonus, plus outstanding benefits. If you qualify for one of the above positions, send resume to: **Donna West, Manager of Human Resources.** No phone calls, please.

cgi

CGI Systems, Inc.
One Blue Hill Plaza
P.O. Box 1645
Pearl River, NY 10965
An Equal Opportunity Employer M/F/H/V

See our PACBASE ad in this issue.

IDMS Database Analysts

The consistent strong growth of Abbott Laboratories, plus the needs of the highly sophisticated and always advancing health care field, demand the best in Corporate Information Systems Support. At Abbott we're meeting that need with top systems technology and a highly progressive environment. We're now seeking individuals to join our ongoing enhancement efforts.

Involves logical and physical database design, implementation of new software releases, and tuning of our current IDMS environment. We require a Bachelor's degree along with 5-6 years data processing experience which includes knowledge of IDMS/R data manipulation and description languages and database internals. ADS/O and CV internals, along with CICS or IDMS-DC programming experience are a plus, as is familiarity with tuning IDMS.

In addition to outstanding corporate backing and a widely recognized technological environment, we provide you with an excellent salary and benefits package that includes profit sharing and retirement plans. We are located in an attractive suburban area just 30 miles north of Chicago. For consideration, please send your resume and salary history in confidence to: **Carol Ives Davis/Corporate Placement Dept., C/5-2, ABBOTT LABORATORIES, Abbott Park, IL 60064.** Abbott is an Affirmative Action Employer.

ABBOTT LABORATORIES

100 Quality Health Care Worldwide
1888-1988

Data Processing
IBM S/38 PROGRAMMERS

Join the nation's fastest growing, most highly respected management seminar company. We're looking for programmers to join our team of professionals.

Successful candidates should have:

- 2+ years solid experience using RPG III, SUE, SDA, DFU, CPF, and open query files
- System conversion experience.
- Knowledge of M.R.C. Query helpful
- Knowledge of PC emulation and support

Qualified? Send your resume with references and salary requirements to:

Jerre Sardou
NATIONAL SEMINARS, INC.
9001 West 63rd St.
Suite 205
Overland Park, KS 66202

Principals only

RELATIONAL DATABASE DEVELOPMENT

The people of Spectrum Technology Group, Inc. are leaders in the application of Database technology to solve business problems. Our leadership provides you an outstanding opportunity to work with the best, learn the latest database products and use your knowledge to make a difference.

We have immediate openings in our New Jersey, Philadelphia, Washington DC, and Florida offices for individuals with experience using **relational products** such as: **Teradata, DB2, Informix** and **Unify,** together with PL1, COBOL, or "C". Experience in logical and physical design or systems analysis is a plus. Relocation assistance provided. Please direct all inquiries to, **Lisa Haurey, (201) 725-4000 P.O. Box 5365 North Branch, NJ 08876**

SPECTRUM
Technology Group, Inc.

No Agencies Please
An Equal Opportunity Employer M/F

MIS PROFESSIONALS

The Dayton Department Store Company (DHDSC) has the following opportunities available for **experienced** MIS professionals.

STAFF MIS PLANNING ANALYST
Requirements include 7-10 years experience with major systems development, project leadership and business system planning, preferably from a large retail organization. An advanced degree in business or MIS is preferred.

SENIOR SYSTEMS ANALYST - DEVELOPMENT
Requirements include 5-7 years system development experience. Significant exposure to IMS and/or DB2 required.

PROGRAMMER ANALYST - SYSTEM SUPPORT
Requirements include 1-3 years COBOL programming/problem solving experience with batch and on-line systems.

PROGRAMMER ANALYST - INFORMATION CENTER
Provide analysis and support for Information Center projects, including DB2 conversion. Requirements include 2-5 years COBOL programming experience in a large scale, IBM environment.

DHDSC is a progressive operating company of one of the largest retail organizations in the country, the Dayton Hudson Corporation. We offer a very competitive salary and a work environment conducive to your personal growth and development.

Qualified applicants please send a resume, including salary history to: **M. Tracy, Executive Placement/862, Dayton Hudson Department Store Company, 700 Nicollet Mall, Minneapolis, MN 55402.** Equal Opportunity Employer.

DAYTON HUDSON
DEPARTMENT STORE
COMPANY

TECHNICAL CONSULTING

TECHNICAL SUPPORT GROUP (TSG) is a leading provider of technical advisory, management and implementation services to for une 500 clients in the Chicago area. Expansion of our client and project base has created opportunities for individuals with a minimum of 5 years experience and proven design and programming skills in the following areas:

SYSTEM PROGRAMMERS – Solid technical experience in VM/CMS and/or VTAM/NCP.

CICS APPLICATION DEVELOPERS – Experience in BAL and/or COBOL, VSAM.

VM/CMS APPLICATION DEVELOPERS – Experience with one or more of the following: REXX, SQL/DS, ISPF, and DIALOG MANAGER.

UNIX APPLICATION DEVELOPERS – Experience with device drivers, PS2/80, C.

At TSG, our focus is technical strength. If you want technical diversity and career growth, TSG wants to talk to you. We offer a competitive salary and company paid benefits including profit sharing. For confidential consideration, please send resume with salary history to: **Manager of Personnel,**

TSG

TECHNICAL SUPPORT GROUP, INC.
150 N. Michigan Ave., Suite 2715
Chicago, IL 60601

Equal Opportunity Employer

ADS/O IDMS ORACLE

Excellent Benefits
Salary $30-45K
Southeast Locations

800-874-9595

NPS
NATIONAL PROGRAMMING SERVICES, INC.

121 Executive Center Drive □ Suite 126
Columbia, South Carolina 29210

SENIOR INFORMATION ANALYST

Spartan Information Services plays a critical role in servicing the needs of our corporation and nearly 500 independently owned supermarkets in Michigan, Indiana and Ohio with an annual sales of $1.5 billion. To meet the variety of needs generated by our continued growth, we are seeking individuals to work in our Grand Rapids Corporate office who are experienced in financial systems with a background using McCormack & Dodge software.

Our Technical Environment is IBM 3090/150E and PC's, MVS, TSO, COBOL, VSAM, ADABAS, NATURAL.

Responsibilities will include support of existing and implementation of future McCormack & Dodge systems, application programming, business analysis and information system design. The ability to work on both independent and team projects and interface with end users is expected.

Spartan Stores offers a competitive compensation package including fully paid benefits and an opportunity for professional growth. To be considered, submit your resume in confidence to:

SPARTAN STORES INC.
Attn: Placement Specialist
850-76th St., SW
Grand Rapids, MI 49518

An Equal Opportunity Employer

IMS Applications Programmer Analysts

AMERICAN EXPRESS

Phoenix, Arizona

American Express, an international leader in the financial services industry, is expanding the Business Systems Development group in Phoenix. Openings are available for individuals in various Programmer Analyst positions.

Requirements include a minimum of 2 years OS COBOL applications programming experience in an IBM compatible environment utilizing JCL, MVS, TSO and IMS batch and/or on-line applications.

Senior positions require 4 to 6 years experience with systems analysis and design in an IMS/project environment.

Join a team of professionals in a state-of-the-art facility (we process with the 3090 series CPUs). Salaries are competitive based on experience; an excellent benefits package is available.

If you qualify and are interested in a challenging future, please send your resume and salary history in confidence to: **Joan Benjamin, AMERICAN EXPRESS, P.O. Box 53781-Op, Phoenix, AZ 85072-3781.**

An Equal Opportunity Employer

M.I.S. MANAGER

You have the experience . . . now is the time to grow!

Now is the time to join a dynamic on-the-go health care organization that can offer professional and technical growth.

Ideal candidate will have a bachelor's degree or equivalent and a minimum of four years' management experience in DP, strong supervisory and communicative skills, proven record of accomplishment in implementation, working knowledge of RPG III, IBM System 38 education/experience. Position reports to Director of MIS.

Our 338-bed acute care hospital is located in a lovely four seasons area — in the heart of the finest vacation land throughout the year.

Our salaries are commensurate with level of experience, the benefits are generous and include 100% tuition reimbursement. To apply, send resume in confidence or call

Joan Howard
Employment Manager
(616) 728-4690

HACKLEY HOSPITAL

An Uncommon Leader

1700 Clinton St.
Muskegon, MI 49442-5592

An Equal Opportunity Employer M/F

SYSTEMS 38
PROGRAMMER ANALYST

Wellco Carpet Corporation, a leading carpet manufacturer located 50 miles north of Atlanta, GA is seeking an experienced RPG III Programmer Analyst. Experience with systems design and on-line programming preferred. Job involves new systems development and maintenance of existing systems. We offer a competitive salary, benefits package and opportunity for advancement. Contact Douglas Nowlin/Albert Johnson:

Wellco Carpet Corp.
P.O. Box 12281
Calhoun, GA 30701
(404) 629-7301

AiC. It stands for Analysts International Corporation

It means Always Innovative Contractors.

Helping clients from a diversity of industries reach the most efficient, advanced and appropriate DP solutions takes more than technical knowledge. More than interpersonal communications skills. More than a knack for solving problems. It takes innovation. All the time. It takes an AiC contractor.

If you pride yourself on possessing all the qualities mentioned above, we want to hear from you about the challenges below:

IBM Mainframe; MVS, COBOL, BAL, TELON, CICS, IMS, IDMS, ADABAS, NATURAL, SUPRA

Honeywell DPS8; COBOL, DMIV, IDS II

HP3000; Powerhouse, COBOL, IMAGE

DEC VAX; COBOL INGRES, SQL, DECNET

MSA
McCormack & Dodge

Where you live is just as important as where you work. And living in the Twin Cities community is attractive indeed. One of the Midwest's hotbeds of high technology, Minneapolis-St. Paul offers as much to your family as AiC does to your career. Excellent education. Tremendous outdoor recreational resources. Impressive cultural and entertainment facilities. Professional sports. And much more.

Along with a great environment in which to nurture your innovation and creativity, AiC offers you a competitive salary and comprehensive benefits (including relocation assistance). For more information, call Lisa Dumke at (612) 8350-2330 or 1-800-328-9929. Or send your resume to Lisa at: Dept. C126.

Analysts International Corporation
7615 Metro Blvd.
Minneapolis, MN 55435

Equal Opportunity Employer M/F/H

We prefer to hear directly from candidates.

COMPUTER CAREERS NETWORK

Now you can reach the qualified computer professionals you're looking for with Computer Careers Network.

Every week, the new IDG Communications Computer Careers Network of eight leading computer and communications newspapers delivers your recruitment advertising to an audience of highly qualified computer and communications professionals. When you put the proven, weekly authority of Computerworld and specialized readerships of InfoWorld, Network World, Digital News, Federal Computer Week, and three regional editions of Computer Currents to work for you, you get the best chance ever to target the qualified professionals you need to reach.

Select the publications you need to reach the talent you're looking for. Then target your audience by region. Or blanket the entire nation.

To put the Computer Careers Network to work for you, call the sales office nearest you today.

Sales Offices: John Corrigan, Recruitment Advertising Sales Director, 617-879-0700; **BOSTON:** Al DeMille or Nancy Percival, 800-343-6474, (in Mass. 617-879-0700); **NEW YORK:** Warren Kolber, 201-967-1350; Jay Novack, 800-343-6474. **WASHINGTON, D.C.:** Katie Kress, 703-573-4115; Pauline Smith, 800-343-6474. **CHICAGO:** Patricia Powers, 312-827-4433; Ellen Casey, 800-343-6474. **LOS ANGELES:** Barbara Murphy, 714-250-0164; Chris Glenn, 800-343-6474. **SAN FRANCISCO:** Barbara Murphy, 714-250-0164; Chris Glenn, 800-343-6474.

TECHNICAL SUPPORT MANAGER

The University of Arkansas for Medical Sciences is seeking an experienced data processing professional for the newly created position of Technical Services Manager. This individual will be responsible for IBM and DEC systems programming, microcomputing and networking support. The hardware environment consists of an IBM 4381 running VM and MVS/SP, a VAX 8530, and a campus-wide Ethernet network.

The ideal candidate will merge technical expertise with an ability to manage technical professionals. He or she will have a capacity planning orientation and familiarity with local area network. Excellent communications and organizational skills are required.

Please send resumes and salary history to:

UNIVERSITY OF ARKANSAS FOR MEDICAL SCIENCES

Mr. Jim Stephenson, Assistant Director Customer Services
University of Arkansas for Medical Sciences
4301 West Markham, Slot 549
Little Rock, Arkansas 72205
(501) 661-5300

RESUMES MUST BE RECEIVED BY MONDAY, MAY 16, 1988 FOR CONSIDERATION.

UAMS is an equal employment opportunity employer

DATA CENTER SUPERVISOR

Spartan Stores is a $1.5 billion wholesaler serving nearly 500 stores operating in Michigan, Indiana and Ohio. As part of a major effort to upgrade our information services, we are seeking a Senior Level Data Center Supervisor who will provide leadership and oversee all main-frame applications. The person will be responsible for all 3 shifts, shift supervisors and operators in our Grand Rapids Corporate office.

We operate a state-of-the-art data center using 3090 IBM hardware running MVS, CICS, ACF/VTAM, ACF/NCP, UCC7, UCC8, UCC11, JES2, and many on-line applications.

We require a minimum of 5 years supervisory experience in a large data center environment. We offer a competitive compensation package including fully paid benefits and an opportunity for professional growth. This is an excellent opportunity with a leader in the food industry. To be considered, please submit your resume in confidence to:

SPARTAN STORES INC.
Attn: Placement Specialist
850-76th St., SW
Grand Rapids, MI 49518

An Equal Opportunity Employer

CONTRACT PROGRAMMERS

We have immediate opening for programmer Analyst with 1 to 3 years experience with 1 or more of the following skills: FOCUS, COBOL, IMS, DB/DC, ADFII, DB2, CICS, DATACOM, DB/DC, IDMS. We offer ex. benefits and long term contracts. Send resumes to one of our local offices.

DSR, Ltd.
4100 Adams Road
Suite D202
Bartlesville, OK 74006

DSR, Ltd.
Suite 300
2500 City West Blvd.
Houston, TX 77042

DSR, Ltd.
Suite 600
111 West Port Plaza
St. Louis, MO 63146

Or call
1-800-843-7866

EOE

MAPICS

S/36 or S/38
PA's

Must Have:
- MAPICS Inventory Management or Purchasing Modules.
- 3 Years Plus Exp.
- Be willing to relo to Atlanta

Client is a progressive firm offering salaries to $40K and bonus incentives.

MEG LANDSEADEL
SR. MIS RECRUITER
(404) 393-0933

FOX-MORRIS ASSOC.
47 Perimeter Ctr., Ste. 540
Atlanta, GA 30346

FLORIDA CONNECTION

Proj. Mgr. O/E, MVS/IMS To $45K
MVS PL1, IMS, CICS ..... To $40K
HBO, SMS, PCS ..... To $50K
VAX, Oracle, Focus ..... To $35K
DBA IDMS/R ..... To $40K
VSE, CICS, DL/1 ..... To $34K

Call Russ Bray, C.P.C.

Tandem, TAL, ACI, MAX .To $50K
VAX, AUTOCAD ..... To $40K
VAX, C, Pascal, Video ..... To $40K

Call Leslie Mikoch

AVAILABILITY, INC.
813/289-5800
Dept. C, P.O. Box 25434
Tampa, Florida 33622

DATA PROCESSING PROFESSIONALS

The same thing could happen to your career.

When a company grows this fast, so do the people working for it. Just ask any of the five hundred data processing professionals who now work for us. Or better yet, the handful who started with us in 1985. We've grown this fast because we provide the Fortune 500 clients we serve with answers to all their MIS needs—from telecommunications, application analysis, design and development—to data base management, management consulting and systems software support.

And, if you qualify for any of the following positions, here's your chance to get a graph like this with your name on it.

We have immediate openings in various areas for:

PROGRAMMER/ANALYSTS PROGRAMMERS

with at least two years' practical business experience in any of the following skills:

NEW JERSEY	DALLAS, TEXAS
'C', UNIX	ACP/PARS
DB2	CSP.2 DB2
TELON (CICS or IMS)	ADABAS/NATURAL II
IMS DB/DC	IMS DB/DC (COBOL or PL/1)
NEW YORK	**FLORIDA (contact NJ office)**
TERADATA	Carrier Access Billing
HOGAN Software Systems	IMS DB/DC COBOL
McCormack & Dodge (esp. A/R and Utilities)	Model 204
TESARAC	UNIX, 'C'

TRECOM offers diversity of assignments, highly competitive salaries, and a comprehensive benefits package, plus a Company contributory 401(k) plan, tuition reimbursement and a generous relocation allowance.

So if you enjoy a red-line speed and a high climb, forward your resume to the appropriate contact below:

Susan McCaffrey
333 Thornall Street
Edison, NJ 08837
(201) 549-4100

Steve Greller
45 Broadway
15th Floor
New York, NY 10006
(212) 809-6600

Anne Burke
1 Galleria Tower,
Suite 500
13355 Noel Road
Dallas, TX 75240
(214) 960-7015

TRECOM

Business Systems Inc.

An Equal Opportunity Employer

PROGRAMMERS/ ANALYSTS

Due to a constant increase in demand for our services, a great number of consulting positions are available for experienced professionals. Individuals selected for these positions must be experienced with: COBOL, BAL, PL/1, or FORTRAN and some of the following:

DB2/SQL	IDMS/ADSO
IMS DB/DC	ADABAS/NATURAL
S/38 RPG III	UNIX "C"
CICS	HP 3000, IMAGE
HONEYWELL	MSA
ORACLE/SQL	UNISYS
APS	CP/CS

Current opportunities also exist for Systems Programmers and DBA's. For consideration please call or send your resume to:

Interactive Business Systems, Inc.

414/786-0220
205 Bishops Way ● Suite 206
Brookfield, WI 53005

Systems Professionals

"NICE JOB."

It's just a couple of words. But they're very nice to hear. And at Humana you **are** appreciated.

Our Systems Professionals do great work for us because we expect it of them. We only hire the best and the brightest. We're committed to state-of-the-art technology. After all, the work we do at Humana impacts health care nationwide.

We are currently seeking qualified candidates who have a Bachelor's degree and 2-5 years experience with IBM 30XX's, COBOL, OS/MVS JCL, VSAM, TSO/ISPF. Some positions require IDMS, ADS/O, CICS. Insurance experience is a plus. We offer competitive salaries and benefit packages, a fitness center and an excellent work environment at our Louisville-based headquarters.

Join us for exceptional challenges and growth potential. Send your resume today to: **Rose Schreck, Humana Inc., 500 W. Main St., Louisville, KY 40201-1438. No agencies please.** EOE M/F.

Humana®

DATA PROCESSING PROFESSIONALS

Join one of the fastest growing consulting firms in the Southeast! Overwhelming demand has created new openings in the areas serviced by our NASHVILLE, TN; CHARLOTTE, NC; and COLUMBIA, SC offices in the following areas:

* ADABAS/NATURAL
* IDMS, ADS/O
* IMS DB/DC
* VAX, FORTRAN, INGRES
* CICS
* CURRENT Q CLEARANCE
* TANDEM, TPX
* HABITAT
* 4th DIMENSION/ APPLE
* HP3000 SYSTEMS PROGRAMMER
* VAX, COBOL, BRITTON LEE
* DNC, DISCRETE MANUFACTURING
* OPERATIONS RESEARCH, SAS

We offer excellent benefits and competitive salaries. Call or send resume to our Corporate Office today:

AMERICAN COMPUTER PROFESSIONALS
P.O. Box 5125
Columbia, SC 29250
(800) 322-0666
equal opportunity employer m/f

CONTRACT PROGRAMMING RECEIVABLES FINANCING

We are interested in financing new or small existing contract programming firms. We will provide payroll processing and financing for all of your receivables while allowing you to retain all of your present equity. You will be able to withdraw your capital for business or personal use or to buy out an existing partner. Our goal is to allow you to expand at your own pace while spending all of your time selling and recruiting.

NATIONAL PROGRAMMING SERVICES
237 N. Woodward
Birmingham, MI 48011
(313) 646-4708

Arthur Young is only interested in Information Systems Professionals who see their positions a bit differently.

DATA PROCESSING

Arthur Young is one of the most successful management consulting firms in the U.S. and we currently have openings in our Information Technology Group nationwide.

The ideal candidates will be highly qualified and experienced Information Systems Professionals with 3 to 5 years plus experience in an IBM systems building environment.

Related experience should include:

Database	Language	Other
IMS	COBOL	CICS
IDMS	PL/1	CASE TOOLS
DB2	BAL	Information Engineering
ADABAS	4GL	Full life-cycle system development
Application		Project Leader/Manager
Manufacturing		Programmers & PAs
Retail/Distribution		System 38
Utilities		Mantis
Government		
Banking/S&L		
Insurance		
Oil and Gas		

A MEMBER OF ARTHUR YOUNG INTERNATIONAL
Arthur Young
We Take Business Personally

SOUTHWEST – Dallas, Houston, St. Louis, Kansas City and other SW locations: Richard Bell, 2121 San Jacinto, Dallas, TX 75201 (214) 969-8297.
MIDWEST – Chicago, Minneapolis, Detroit, Columbus and other MW locations: Jim McCormick, One IBM Plaza, Chicago, IL 60611 (312) 645-3035.
NORTHEAST – Boston, Washington, D.C., Richmond, Philadelphia and other NE locations: Larry Glassman, 3000 K. Street NW, Washington, D.C. 20007.
SOUTHEAST – Tampa, Charlotte, Birmingham, Atlanta and other SE locations: Dana Milner, 235 Peachtree Street NE, 2100 Gas Light Tower, Atlanta, GA 30043 (404) 581-1300.
NEW YORK – Diana Mackey, 277 Park Ave., New York, NY 10172 (212) 407-1759.

"For Source Edp, Computerworld is a people-and profit-puller."

Dave Grinnell
Vice President & Ad Director
Source Services Corporation
Mountain View, CA

Dave Grinnell is Vice President and Advertising Director of Source Services Corporation, the parent company of Source Edp, the world's largest recruiting firm that specializes in the computer profession. Source Edp has been an advertiser in Computerworld — almost from inception of the publication. Here's why:

"With its fantastic pass-along circulation, Computerworld not only reaches executives in computer management, but programmers, systems analysts and other individual contributors that are in particular demand by our client firms. It helps us reach the heart of our candidate base efficiently."

"Not only does Computerworld reach our market, but it reaches a market that's actively interested in computing and fostering their career growth. Conservatively, over the years, we have helped many thousands of Computerworld readers find new positions within the computer profession; many times more than those readers of other technology or trade publications. How do we know? We have an elaborate tracking system that helps us verify from which media respondents see our ads. Typically, Computerworld generates over four times more respondents who eventually are placed in new positions by Source than the next nearest computer industry publication."

"Because we're national in scope, we need the coast-to-coast coverage and support that Computerworld offers our 75 office network. We've helped Computerworld readers find candidates or move from Houston to Rochester, NY. . . . from Seattle to Miami . . . you name it. That's something that local newspapers, local radio and other media we also use can't accomplish for us with as much direct success."

"In short, why do we depend on Computerworld? First, it's profitable reading for employers. Second, it's profitable reading for those seeking new employment. And third, through our services, it's also profitable reading for us. It's a 'win-win-win' situation for all."

Computerworld. We're helping employers, top professionals and people who help them get ahead get together. Every week. Just ask Dave.

For all the facts on how Computerworld can put you in touch with qualified personnel, call your local Computerworld Recruitment Advertising sales representative.

COMPUTERWORLD

Sales Offices:
BOSTON: 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171, (617) 879-0700
NEW YORK: Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652, (201) 967-1350
WASHINGTON: 3022 Javier Road, Suite 210, Fairf . VA 22031, (703) 573-4115
CHICAGO: 10400 West Higgins Road, Suite 300, Rosemont, IL 60018, (312) 827-4433
LOS ANGELES: 18004 Sky Park Circle, Suite 100, Irvine, CA 92714, (714) 250-0164
SAN FRANCISCO: 18004 Sky Park Circle, Suite 100, Irvine, CA 92714, (714) 250-0164

An IDG Communications Publication

With your experience in data processing and our access to better positions, isn't it time you met Robert Half?

There's one good way to make the most of your job experience in data processing. Combine it with ours!

Ever since the computer revolution began, our offices have been helping thousands of data processors find better jobs. Jobs with fine companies. Jobs that meet the requirements of the professional looking for a challenging future. And there's a good chance that we can even find the right job in the exact location you select—around the corner or around the world. You see, we've got 130 offices on three continents which gives you maximum exposure to what you want, and where you want it.

In data processing experience means everything. Yours and ours. Put it to work today by calling a nearby Robert Half office. You'll be glad you did.

ROBERT HALF® DATA PROCESSING

* Founder of Robert Half International Inc. and author of "Making It Big In Data Processing," Crown Publishers (July 1987).

© 1987 Robert Half International Inc.

The College of St. Benedict, a liberal arts college for women and St. John's University, a liberal arts college for men, are seeking a Director for their joint administrative computer center. This is a 12-month full-time position beginning July 1,1988. Principal responsibilities will be to direct the two corporations administrative computer system designed to ensure that information is available to the users on both campuses in a timely, reliable, complete and economical basis. Position requirements include a required Bacholors degree in Computer Science, management or related field. Experience with a DEC VAX, Information Associates software, and in a Director positions is preferred. Sensitivity to interpersonal relations combined with communications and management skills will be a major consideration when evaluating candidates for this position. Salary commensurate with experience and qualifications. Submit a letter of application, current resume, and three letters of recommendation:

Kathy Flynn, Wage and Benefits Coordinator, College of St. Benedict, 37 South College Avenue, St. Joseph, MN 56374. Application receive after May 20, 1988 cannot be guaranteed consideration. Women and minorities are encouraged to apply.

SOFTWARE DEVELOPERS
SOFTWARE ENGINEERS
PROGRAMMER/ANALYSTS

CPS is a Southern California based services company. We need experienced professionals with the following skills:

Software Developers with IBM Assembler Language and good knowledge of DOS/VSE or MVS System Services. Will assist with Visa for qualified foreign nationals.

Software Engineers with ADA or Avionics experience. Will assist with relocation. Must be U.S. Citizen.

- TPF or IMS or MRP or FOCUS
- Systematics Banking Systems
- DOS/VSE System Installation

CPS offers Contract-to-Hire and Consulting assignments in Southern California. Our permanent employees enjoy competitive salaries, company paid insurance and other attractive benefits.

Call collect (213) 380-2681 or send your resume to:

COMMERCIAL PROGRAMMING SYSTEMS
3400 W. 6th St. Suite 209
Los Angeles, CA 90020

LABORATORY OF COMPUTER SCIENCE
PROJECT MANAGER

Project Manager with the primary responsibility for the hardware implementation of the Monsoon dataflow machine. The researcher will participate in the design of the height level architecture of the Monsoon dataflow machine and take primary responsibility for its implementation. The researcher will complete the top level design of a processor for Monsoon that will support efficient execution of dataflow graphs with a minimum of hardware. In addition, the successful candidate will: manage the hardware implementation of a single board version of this processor and a subsequent VSLI version; manage the overall integration of the processors, the network, and the I/O system into the Monsoon System; and supervise a team of three to four research staff.

Position requires a PhD degree in computer science, expertise in dataflow systems as demonstrated by publications. Extensive experience in processor and computer system design, demonstrated by participation in the design of a significant system, and a familiarity with compiler and operating systems design. Research experience in functional languages is highly desirable. **Job No. R88-056.**

LABORATORY OF COMPUTER SCIENCE
RESEARCH ASSOCIATE

Research Associate to work on the development of dataflow graph interpreters. This includes extending and maintaining the existing GITA code for Texas Instruments and Symbolics Lisp Machines, and Sun workstations. The existing code must be updated to run on new releases of vendor software and extended to add new and updated features. The existing code will also be ported to other workstations, and possibly to Cray supercomputers. This includes the port of GITA from Lisp into C. The development work will also include the development of new dataflow graph interpreters. In addition, the position involves the design and implementation of the I/O system software for the Monsoon dataflow machine, including participation in identifying the hardware configuration of the I/O system. The primary work involves developing device drivers and other system programming tasks for the I/O processors of Monsoon. This work will be done in C for a Unix operating system.

Position requires an advanced degree (MS or PhD) and extensive related experience. Direct experience in developing operating systems and resource managers is required. Extensive experience with C and Unix, as well as Lisp is required. Research experience in functional languages and dataflow is highly desirable. **Job No. R88-057.**

LABORATORY OF COMPUTER SCIENCE
RESEARCH ASSOCIATE

Research Associate with primary responsibility for the compiler for the functional language Id. The focus of the compiler work will be the development and implementation of new optimizations. The work will include extending the existing compiler to accommodate new features in the Id programming Language. The researcher will also participate as a member of the team developing Id.

Position requires a PhD in computer science and extensive experience in compiler development and compiler optimizations for functional languages as demonstrated by publications. Familiarity with dataflow is highly desirable. **Job No. R88-058.**

Please send two copies of resume and cover letter, referencing job R88-056, R88-057, or R88-058, to: James H. McCarthy, MIT Personnel Office (E19-238), 400 Main Street, Cambridge, MA 02139. MIT is a non-smoking environment.

MIT is an equal opportunity/affirmative action employer

A COMMUNITY AT WORK

MIT

Master Systems Programmer needed now!

You must meet these specific requirements to work for more money, more benefits in Saudi Arabia!

The Saudi Maintenance Corporation, under contract with the U.S. Army Corps of Engineers has an **IMMEDIATE** requirement for a **MASTER SYSTEMS PROGRAMMER** with the following qualifications:

- Five years of progressive data processing experience.
- Three years experience in the installation, maintenance and support of IBM VM, DOS/VSE, MVS/XA CICS/VS, ACF/NCP and related software in IBM 43XX series, 3090, 308x or 3030 series hardware environments.
- Systems programming experience in IBM software to include MVS/XA, VSAM. CICS, TSO and ISPF.
- Proficient as a programmer in Assembler, COBOL, CLIST, DB2/SQL and Job Control Language
- Be able to accomplish complete system GEN and PFT's.

FOR IMMEDIATE INTERVIEW

Must have valid US Passport. Send **detailed** resume & copy of training certificates, diplomas and supporting documents to:

SIYANCO SERVICES CORPORATION
15401 Vantage Pkwy. West, Suite 100, Dept. CW01, Houston, Texas 77032
NO FEE Telephone: 713/590-4261 **NO FEE**

ATTENTION CONTRACTORS

OUR JOB ORDERS ARE PROGRAMMED FOR YOU !

- ADABAS NATURAL
- S/38 S/36
- VAX
- DB2 OR CSP
- "C" UNIX
- SQL
- NOMAD
- MSA
- ULTRA/MANTIS
- FOCUS
- IMS DB/DC
- IDMS ADS/O
- CICS RPG
- CICS BAL
- HP3000 HP1000
- LIFE70
- PMS
- ACF2

Call or send resumes to: Roger Setzer

DP RESOURCES, Inc.
P.O. Box 5057
Burlington, NC 27216-5057
(919) 222-8083

SOFTWARE OPPORTUNITIES
1-800-423-5383

Let our National Award winning computer specialists assist you in your search. We have over 250 affiliated offices around the country ready to work for you! Some of our HUNDREDS of current needs include:

LIFE INSURANCE	To $60K
UNIX INTERNALS	To $60K
SYSTEM/38	To $40K
IDMS, IMS or ADABAS	To $50K
P/A (COBOL or ALC)	To $40K
UNIX/C	To $50K
MVS or VM INTERNALS	$ OPEN
ACF/VTAM/NCP	To $50K
DB2/SQL	To $60K
COBOL/CICS	To $40K
SAUDI ARABIA	To$60K

Degree, COBOL, CICS, & DL/1

ROBERT SHIELDS & ASSOCIATES
P.O. Box 890723, Dept. C
Houston, Texas 77289-0723

RSVP SERVICES

• ANALYSTS • PROGRAMMERS
SOFTWARE/HARDWARE

Multiply Your Opportunities

With a network of over 1000 client companies and 200 affiliate employment agents nationwide, RSVP can selectively communicate your credentials to companies offering literally hundreds of choice, current career opportunities, clear across the nation.

We guide, You decide

Our no-obligation, no-pressure employment services to degreed, experienced U.S. citizens and permanent residents include resume development and interview arrangement.

If you qualify, call Howard Levin or Maureen McCue at 800-222-0153 or (in NJ) 609-667-4488, or send your resume to either address listed below. Our client companies pay all costs.

RSVP SERVICES
One Cherry Hill Mall, Ste. 614, Dept. C, Cherry Hill, NJ 08002
Dublin Hall, Suite 201, Dept. C, 1777 Walton Rd.
Blue Bell, PA 19422 *(Mail address only)*
Member Firm
computer/net
national placement network

S/38

Programmer/Analysts for software development & consulting positions in various locations. Flexible relocation policy. Move with us to "Silverlake"! Send resume to:

Mincron
350 Fifth Ave.,
Suite 7120
New York, NY 10118
(212) 736-7970

ANALYST/PROGRAMMER: For Mutual Funds Info System, maintain batch programs that interface with other software; analyze, design & develop new programs, test & debug programs & handle syst testing for batch phase to insure that syst will run accord to user specifications. 2 yrs exp or 2 yrs rel programming exp.-Must know: COBOL, OS/VS1 JCL or OS/VS2 JCL, DL/1, IMS DB/DC, VSAM & large IBM mainframe hardware. $34,000/yr, 40 hr wk. Resume to: AJ-362, Pinkerton Computer Consultants, Inc., 20 Broad St., Suite 1302, New York, NY 10005.

SCIENTIFIC PROGRAMMER (Real-Time Control)

The National Radio Astronomy Observatory (NRAO) is seeking a computer professional who will join the astronomers, programmers, and engineers of the Very Long Baseline Array (VLA) Correlator Group in developing on-line, real-time control software for the VLBA Correlator. The Correlator is a signal processing complex of supercomputer performance, containing custom high speed tape drives, pipelined FFT engines and concurrent real-time control computers, which will process the raw data from the VLBA Telescope.

Experience with the C programming language is required; knowledge of Unix, VMS or Versados operating systems is desirable. Experience with real-time control software, particularly in device control, and with 68020-based VME computer systems is highly desirable.

The position will be based at NRAO's headquarters on the campus of the University of Virginia in Charlottesville, VA. NRAO offers an academic-type work environment, competitive salaries and extensive benefits including 24 vacation days per year and generous relocation allowances. For consideration, send your resume, including salary history and requirements, to:

Personnel Manager,

NATIONAL RADIO ASTRONOMY OBSERVATORY
Edgemont Road
Charlottesville, VA 22903-2475
Equal Opportunity Employer M/F

Computer Professionals: Some people were created to solve problems.

Let's examine the rather singular Case of the Reluctant Relocator, who came to our digs with his problem. Our NCA consultant immediately deduced, from the grim visage and slumped shoulders, that our visitor was unhappy with his present circumstances. After a thorough interrogation and by applying the three-pipe method of analysis our consultant proffered a solution... relocation! Our visitor agreed, rather reluctantly at first, until he learned that our NCA network, with offices in most major cities, could find him the position he wanted, where he wanted to live... before he moved...and at no cost to him for interview and relocation expenses.

Come in. Call. Or mail your resume to the NCA firm nearest to you. No charge for our services. Confidentiality is assured. Relocation...it's elementary.

National Computer Associates

ATLANTA: DataPro Personnel Consultants 400 Perimeter Center Terrace, Suite 650 Atlanta, GA 30346 (404) 392-4242
BALTIMORE: CIPS Inc. 1107 Kenilworth Drive, Suite 206 Towson, MD 21204 (301) 296-9420
BOSTON: Robert Kleven & Co., Inc. P.O. Box 636 Lexington, MA 02173 (617) 861-1020
CHICAGO: Thomas Hirtz & Associates 150 North Wacker Drive, Suite 1700 Chicago, IL 60606 (312) 977-1555
CINCINNATI: Task Group 7875 Reading Road Cincinnati, OH 45237 (513) 821-8275
CLEVELAND: Innovative Resources, Inc. Statler Office Tower, Suite 426 East 12th & Euclid Cleveland, OH 44115 (216) 621-4220
COLUMBUS: Michael Thomas, Inc. 470 W. Wilson Bridge Road, Suite 340 Worthington, OH 43085 (614) 846-0826
DALLAS: DataPro Personnel Consultants, Inc. 13355 Noel Road, Suite 2001 Dallas, TX 75240 (214) 661-8600
DENVER: Abacus Consultants, Inc. 1777 South Harrison Street, Suite 404 Denver, CO 80210 (303) 759-5064
DETROIT: Electronic Systems Personnel 3000 Town Center, Suite 2580 Southfield, MI 48075 (313) 353-5580
GREENSBORO: DataMasters P.O. Box 14548 Greensboro, NC 27415-4548 (919) 375-1461
HARTFORD: Compress Incorporated 900 Asylum Avenue Hartford, CT 06105 (203) 549-4240
HOUSTON: Career Consultants, Inc. 1980 Post Oak Boulevard, Suite 1050 Houston, TX 77056 (713) 626-4100
INDIANAPOLIS: The Consulting Forum, Inc. P.O. Box 688718 Indianapolis, IN 46268 (317) 846-6630
KANSAS CITY: DP Career Associates 6405 Metcalf, Suite 502 Shawnee Mission, KS 66202 (913) 236-6288
LOS ANGELES: Superior Resources, Inc. 22653 Pacific Coast Highway, Suite 1-105 Malibu, CA 90265 (818) 884-3000
MIAMI: Data Sciences Personnel, Inc. P.O. Box 6577 Hollywood, FL 33024 (305) 434-6112
MILWAUKEE: EDP Consultants, Inc. Chancellory Park II, Suite 350 350 N. Sunnyslope Road Brookfield, WI 53005 (414) 797-8855
MPLS./ST. PAUL: Electronic Systems Personnel 880 International Centre 900 2nd Avenue South Minneapolis, MN 55402 (612) 338-6714
NEW JERSEY: Systems Search 90 Millburn Avenue, P.O. Box 751 Millburn, NJ 07041 (201) 761-4400
NEW YORK: Botal Associates, Inc. 7 Dey Street, Suite 410 New York, NY 10007 (212) 227-7370
PHILADELPHIA: Systems Personnel, Inc. 115 West State Street Media, PA 19063 (215) 565-8880
PHOENIX: Professional Career Consultants 4725 North Scottsdale Road, Suite 200 Scottsdale, AZ 85251 (602) 274-6688
ROCHESTER: Traynor Confidential Ltd. 9 Cobbs Street, Suite 400 Rochester, NY 14604 (716) 325-8610
SAN DIEGO: Technical Directions Inc. 9605 Scranton Road, Suite 304 San Diego, CA 92108 (619) 297-5611
SAN FRANCISCO: The Computer Resources Group Inc. 303 Sacramento Street San Francisco, CA 94111 (415) 398-3535
SEATTLE: Houser, Martin, Morris & Associates 110 110th Avenue N.E., C-90015 Bellevue, WA 98009 (206) 453-2700
STAMFORD: Hipp Waters Professional Recruiting 707 Summer Street Stamford, CT 06901 (203) 357-8400
SYRACUSE: CFA Associates Personnel Inc. 5790 Widewaters Parkway Dewitt, NY 13214 (315) 446-8492
WASHINGTON DC: Bill Young & Associates 6322 Professional Hill Drive Fairfax, VA 22031 (703) 573-0200

Software Design & Development, Inc.

The UNIX® Specialists

Software Engineers
*We Need Your Experience**

Unix/C
with Strong
Database
• 4GL a Plus •

Call or send Resume for immediate response

P.O. Box 10877
454 South Anderson Rd
Rock Hill, SC 29731

1-800-634-8086

*2 years minimum experience

Programmer-Analyst II; 40 hrs/wk; 9 a.m. - 5 p.m.; $31,500/yr. Job requires M.S. degree in computer science & engineering and 18 months experience as programmer-analyst. Job also requires: 1) exp. must include 18 mos. exp. designing computer software; 2) 1 grad course in logical design of digital computers; 3) 1 grad course in statistics & data analysis; & 4) 1 grad course in linear/matrix algebra; Job duties: Design, implement & test data analysis software for the High Resolution Doppler Imager (HRDI). Develop & present detailed functional & technical specifications for software. Interface with both research scientists & engineers to perform ongoing analysis of science data collected by HRDI to determine wind & other physical profiles in upper atmosphere. VAX & PC Hardware, VMS operating systems, & FORTRAN computer language will be used to complete job duties. Qualified applicants should send resume & verification of requirements to: 7310 Woodward Ave, Rm. 415, Detroit, MI 48202. Ref#25388. Employer Paid Ad.

SYSTEM SUPPORT ENGINEER: Provides technical support for software products and operating systems. Responsible for isolating product problems, verifying and providing workarounds, generating and maintaining technical problem information publications, and delivering technical training modules on new products. Acts as interface between field, engineering and marketing groups. University level courses or experience to include operating systems, computer architecture, microprocessors, software engineering and debugging. MS or equiv. Computer Science. $2,632/month. Job Site: Hillsboro, OR. Clip this ad and send with resume to: Employment Division, Attn: Job Order Number 2120421, 875 Union Street N.E., Room 201, Salem, Oregon 97311.

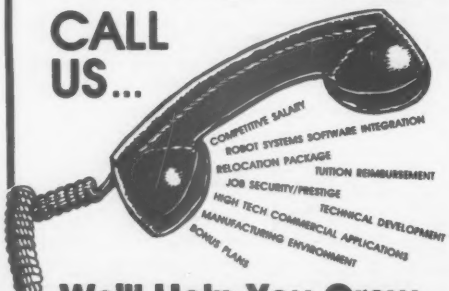
Director of Information Technology

Hillsborough County, Florida (Tampa) is seeking a highly qualified Management Information professional to oversee the development and implementation of a comprehensive plan for information technology which integrates telecommunications, data processing and office systems into a coherent, economic and effective service system for county operations. Prefer candidate with a bachelor's degree in Management Information Systems or a related field; and a minimum of 10 years of progressively responsible relevant experience, including 5 years in a management capacity. Salary commensurate with qualifications. Submit resume with salary history by May 30, 1988 to: Exempt Recruiting, Department of Human Resources, 412 Madison Street, Suite 1003, Tampa FL 33602. Refer to Position #DIT1. AA/EOE.

Computer Software Engineer wanted to analyze complex systems requirements; design, develop and implement various business application software for Burroughs Large Systems using BNAV2, LPA, DCALGOL, DMS II, COMS, CP2000, ADOS, SDF, custom communication protocols and Burroughs Fourth Generation Language LINC II; Requires M.S. degree in Computer Sciences or Computer Engineering and one year experience in job offered or one year related experience as a Computer Systems Analyst; $36,300.00 per year; 40 hours per week. Send resume to 7310 Woodward Ave., Room 415, Detroit, MI 48202. Ref. #25198 "Employer Paid Ad."

Experienced Programmer/Analysts

CALL US...



We'll Help You Grow

M.I.S. International is one of Michigan's largest consulting firms. For over 17 years our data processing and engineering professionals have provided services to Fortune 500 firms including the major automobile manufacturers and suppliers.

We are enjoying exceptional growth in both our Michigan and Atlanta Divisions making this a perfect time to step up to a permanent position on our technical staff. We're interested in Programmer/Analysts with at least one year of experience in the following:

- **IMS DB/DC, COBOL**
- **DB2**
- **CICS, COBOL**
- **CICS System Programmer**
- **SYSTEM 38 RPG III**
- **VAX/VMS**
- **LIFE 70, Insurance Bkgd.**

For more information contact: **Marie Clark, Director of National Recruiting at 1-800-521-2144 or send your resume to: M.I.S. INTERNATIONAL, Corporate Headquarters, 23380 Commerce Drive, Farmington Hills, MI 48024.**

MIS INTERNATIONAL INC.

Farmington Hills • Atlanta

Equal Opportunity Employer

COMPUTER CAREERS NETWORK

Now you can recruit the best qualified computer and communications professionals regionally, nationally and weekly.

How?

With IDG Communications new Computer Careers Network. Choose from the Network's eight computer-related newspapers and tailor youre recruitment message to the type of talented professionals you need to reach – professionals that read Computerworld, InfoWorld, Network World, Digital News, Federal Computer Week, and Computer Currents. Then, target your audience by region. Or blanket the entire nation.

Call your local sales representative today for more information about Computer Careers Network's regional, national and weekly reach.

Sales Offices

John Corrigan, Recruitment Advertising Sales Director, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171; 617-879-0700.

BOSTON: 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171, Al DeMille, Regional Manager, Nancy Percival, Account Executive; 800-343-6474. (in Massachusetts, 617-879-0700).

NEW YORK: Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652; Warren Kolber, Regional Manager, 201-967-1350; Jay Novack, Account Executive 800-343-6474.

WASHINGTON, D.C.: 3022 Javier Road, Suite 210, Fairfax, VA 22031; Katie Kress, Regional Manager, 703-573-4115; Pauline Smith, Account Executive 800-343-6474.

CHICAGO: 10400 West Higgins Road, Suite 300, Rosemont, IL 60018; Patricia Powers, Regional Manager, 312-827-4433; Ellen Casey, Account Exective 800-343-6474.

LOS ANGELES: 18004 Sky Park Circle, Suite 100, Irvine, CA 92714; Barbara Murphy, Regional Manager, 714-250-0164; Chris Glenn, Account Executive, 800-343-6474.

SAN FRANCISCO: 18004 Sky Park Circle, Suite 100, Irvine, CA 92714; Barbara Murphy, Regional Manager, 714-250-0164; Chris Glenn, Account Executive, 800-343-6474.

EXCELLENT MANAGEMENT OPPORTUNITY WITH CITIZENS UTILITIES

Senior Programmer

- **Comprehensive Benefit Package: Medical, Dental, Optical, Life**
- **401K and Pension Plan**

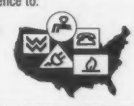
If you have at least four years IBM System 38 and RPG III experience or four years application programming experience and preferably a B.S. or B.A., consider joining one of the nation's largest independent telephone companies.

You will be stationed at our Redding general office to assist in the conversion to an IBM System 38, plus perform routine and special project programming.

If you want to work for our successful and financially secure corporation, send your resume and salary history in confidence to:

Personnel Manager
CITIZENS UTILITIES COMPANY OF CALIFORNIA
P.O. Box 2218
Redding, CA 96099

An Equal Opportunity Employer



SENIOR SYSTEMS ANALYST

This is an excellent career opportunity for a motivated professional to join one of the nation's leaders in commercial real estate.

The ideal candidate will have minimum 4-6 years experience on the System 38, RPG III with strong design and analysis skills. Some coding also required. Excellent communication skills a must along with the ability and desire to interface with users.

If you can thrive in a high energy, fast paced environment and desire a competitive salary with excellent benefits, send resume with salary history and requirements (held in the strictest confidence) along with a cover letter to:

Att: Grace Ben-Ezra

CUSHMAN & WAKEFIELD

A Rockefeller Group Company
Business America's Real Estate Firm
1166 Avenue of the Americas
New York, NY 10036

An Equal Opportunity Employer

DATA PROCESSING PROFESSIONALS

STAR PERFORMERS...

Let your bright ideas shine

Local And Relocation Opportunities To The Boston Metro Area For Experienced DEC/VAX Professionals

Give your career the strategic edge with Computer Horizons Corp., one of the top DP consulting firms in the United States, with sales now exceeding $70 million. Cited by FORBES and BUSINESS WEEK recently as one of the best small companies in the nation. Now is the ideal time to join us as we've targeted the Boston Metro Area for expansion.

Right now, we have exceptional opportunities throughout Boston for Team Leaders, Programmer/Analysts, Programmers, Testers and Quality Assurance professionals with experience in one or more of the following areas:

- **DEC/VAX, VMS**
- **FMS & RMS**
- **COBOL**
- **Performance Analysis & Digital Testing**
- **VAX BASIC**
- **DCL Datatrieve**

We offer you total project involvement and a chance to make decisions. With our impressive list of Fortune 500 clients, you'll have in-depth exposure to diverse new and emerging DP technologies.

CHC offers above average salaries, an exceptional benefits package including medical/dental coverage, life insurance, deferred income savings plan (401k), unlimited tuition reimbursement, generous relocation assistance, and a high visability environment conducive to personal and professional growth.

To find out more about your career advantages here, send your resume or call: **George Tanen, 617-451-0900. COMPUTER HORIZONS CORP., 101 Summer Street, Boston, MA 02110.** An Equal Opportunity Employer M/F.

COMPUTER HORIZONS CORP.

"The Solution Experts"

SOFTWARE SERVICES OF NORTH CAROLINA, INC.

We have immediate job openings on our consulting staff for Programmer Analysts. We offer a full benefit package and pay all moving costs. We pay for referrals. If your skills match any of the following areas, please send your resume.

- **COBOL, CICS, VSAM, IMS, MVS**
- **ADABAS/NATURAL, MVS**
- **IDMS, ADS/O, MVS**
- **IDEAL, DATACOM**
- **SQL, DB2, CSP**
- **MSA (PR, AR, OP)**
- **METHOD 1**

9101 Southern Pines Blvd
Suite 200
Charlotte, NC 28217
(704) 522-6321

FINANCIAL INFORMATION SYSTEMS TECHNOLOGY PACKAGED SOFTWARE CONSULTANTS MSA, M&D, CA, DB2, SAA $30,000 - $75,000+ JOIN AN INNOVATIVE, AGGRESSIVE COMPANY

We have asked D.C. Thomas and Associates, Inc. to find enthusiastic, experienced and sincere people to work with us.

We want to let everyone know that we reward self-starters who have the initiative and expertise to work on our team.

Let us take the first step as your perspective employer ... we will pay expenses for an interview. We are recruiting for positions available in nearly every major city. In addition we will pay recruiting bonuses.

Join Our Team!

One of the most prestigious of the Fortune Companies. Pick your future with care ... let us prove ourselves to you.

You will grow with this dynamic company and you will benefit from first rate professional experience in a progressive systems environment. Qualified candidates are invited to submit a resume, in strictest confidence, to:

D.C. Thomas and Associates, Inc.
1211 North Westshore Blvd, Suite 802
Tampa, Florida 33607

SOFTWARE SPECIALISTS

In the fast changing world of data processing, many find that secure, challenging opportunities elude them! At Merit Systems, we understand the needs of our highly talented staff of software professionals. We hire, challenge and develop our staff to be the best in the industry.

Merit Systems record of growth stands well above the industry average, creating on-going opportunities nationally for our staff to grow professionally and new requirements for tenacious, self-confident individuals who are ready for above average achievement and rewards. The successful candidates will have a minimum of 2 or more years experience in one of the following disciplines:

- **TANDEM**
- **ACP/TPF**
- **DB2/SQL**
- **IMS DB/DC**
- **HOGAN**
- **DATACOM**

Merit Systems support for your career goals is virtually unequaled in the data processing field. We provide an excellent salary, bonus, benefit, profit sharing and continuing education program. To immediately pursue your Merit career call collect or send your resume to:

Jim Whiteford
Tony Felmia
(313) 879-7600
Merit Systems, Inc.
National Headquarters
5900 Crooks Road Suite 200-CW88
Troy, MI 48098
FAX # (313) 879-6076

Merit

FLORIDA/NEW YORK NEW JERSEY/ARIZONA

ANSI/X.12	UNITS/TUXEDO
COBOL/CICS	UNIX/C
IDMS/ADSO	DB2
TANDEM/PATHWAY	ADABASE/NATURAL
CICOL1	ASSEMBLER
FOCUS	RPG II or III
IMS DB/DC	MANTIS/TOTAL
INFORMIX	ORACLE
IDEAL/ADR	WINDOWS
MAPPER	RAMIS
TELEPHONY	PL1
DOS or MVS	VM/CMS
TRANSFORM	PABX
TERRADATA	MFS or BTS
TELON	COM TEN

Many IBM, UNIVAC, VAX and HP contract or permanent positions available with Min. 2 yrs. exp.

ANALYSTS	P.C. SPECIALISTS
PROGRAMMERS	SYSTEMS PROGRAMMERS
PROJ LEADERS	OPERATORS
TELECOMMUNICATIONS	DATA BASE ANALYSTS
NETWORKS DESIGN/SUPP	VOICE/DATA COMMUNICATIONS
QUALITY ASSURANCE	BSEE ENGINEERS
MSA SOFTWARE	LAN

STARTEC UNLIMITED, INC.

20295 NW 2nd Ave Suite 201
Miami FL 33169
(305) 651-3200

902 Louis Court
Princeton, NJ 08540
(201) 855-0085

677 Mossy Branch Court
Longwood FL 32779
(305) 774-1611

3329 E Mitchell Drive
Phoenix AZ 85018
(602) 957-6339

IF YOU'VE GOT THE TALENT... STOP

THE CONSTELL GROUP, a prestigious East Coast leader in Information Systems and Management Consulting, has aggressive growth plans. We need experienced Systems Professionals looking for growth through challenging and demanding engagements with our Fortune 500 clients.

Immediate needs in NJ, NYC, Boston & Westchester for qualified individuals with a min. of 3 yrs exp.

IBM/VAX

- **PL/1, COBOL, CICS, IMS**
- **RELATIONAL DATABASES**
- **BUSINESS ANALYSTS**
- **BANKING**
- **MANUFACTURING**
- **E.D.I.**

Commercial Branch, 216 Stelton Road, Piscataway, NJ 08854
(201) 968-8666

UNIX/IBM

- **UNIX/C**
- **INFORMIX**
- **SYSTEMS ANALYSTS**
- **COBOL, IMS DB/DC**
- **COBOL, PL/1**
- **TSO/SPF**

Communications Branch, 216 Stelton Road, Piscataway, NJ 08854
(201) 968-9310

VAX/IBM

- **VAX/COBOL, BASIC**
- **RDB/PASCAL**
- **BUSINESS ANALYSTS**
- **IMS, PL/1, CICS**
- **TELON, DB2**
- **NOMAD, FOCUS**

New England Branch, 30 Turnpike Rd, Southboro, MA 01772
(617) 485-9500

CONSTELL

We offer competitive salaries along with a comprehensive benefits package. To be considered for one of our openings, please call or submit resumes to the above branches.

SPECIAL ASSISTANT FOR COMPUTING AND INFORMATION SYSTEMS

This chief information systems officer will report directly to the President for development, acquisition, and use of information resources. Qualifications include a master's degree in a computer-related field or an equivalent combination of education and experience; doctorate is preferred. Six years of broad-based, progressively responsible experience in the management of information resources, preferably in higher education, is required. Salary in the 50s.

SWT, located between Austin and San Antonio, offers undergraduate and graduate degrees to 20,000 students. Resume with references should be sent by May 20 to: Special Assistant for Computing Information Systems, Office of Personnel, SWT, San Marcos, Texas 78666. SWT is an affirmative action, equal opportunity employer.

Southwest Texas State University • San Marcos

SOFTWARE PROFESSIONALS

We are looking for expertise in these areas:

UNISYS	LINC, GFS, FSA, DPPS, ATM
VAX	ORACLE, INGRES, ALL-IN-1
IBM	DB2, SQL, IDMS, FOCUS
H.P.	POWERHOUSE TOOLS

All correspondence held strictly confidential. Please send resume to:

PCS H Russell Spivey, Jr. Professionals Consulting Services Corp Headquarters 3625 Alfonta Street Atlanta, GA 30340

When you compare costs and the people reached, Computerworld is the #1 medium for computer-related recruitment advertising.

Place your ads today!

Call toll-free
800-343-6474
In Massachusetts
(617) 879-0700

Glaxo's Growth Is Your Opportunity

Glaxo Inc. is not only one of the Top 10 ethical pharmaceutical firms in America, we're also the fastest growing research-oriented company in the country. As such, we can offer exceptional career opportunities, state-of-the-art facilities, and a firm commitment to producing the most effective pharmaceuticals that experience, imagination, and advanced technology can create. Join Glaxo, and apply your knowledge and career ambitions where they'll do you the most good.

We currently have the following position available at our Corporate Headquarters located in Research Triangle Park, N.C.

SYSTEM PROGRAMMER II

This key programming position, within our MIS Department, will be responsible for the installation and maintenance of CICS and DB2. Background should include a good working knowledge of MVS/XA from a systems point of view, along with 3-5 years experience in a large scale IBM shop as a systems programmer and specific experience with CICS and DB2. Experience with PC to mainframe connectivity issues would be helpful.

Our MIS Department includes state-of-the-art hardware and software including token-ring, vector processors, and the most advanced mainframe and PC software.

At Glaxo Inc., growth opportunities and up-to-date facilities are complemented by a location (near Raleigh/Durham) that has excellent resources in close proximity. Prestigious universities, scenic vistas, lively recreational areas, and exciting cultural opportunities are all a part of the daily life of the Glaxo professional. Further we reward talent and creativity with an excellent salary and benefits package (including a completely equipped on-site athletic facility). Candidates interested in this position, please send resume, including salary history, to:

Human Resources Department
Job #3630B830

Glaxo Inc.
P.O. Box 13398
Research Triangle Park, N.C. 27709

(No Phone Calls, Please)
No Private Agency Referrals, Please
An Equal Opportunity Employer M/F/H/V

Paving the way to a healthier world

We Speak Your Language.

FLORIDA
The Perfect Climate For Professional Growth

We are Romac & Associates specializing in the data processing industry. Currently our technically sophisticated clients have requirements for the following:

PROGRAMMER ANALYSTS – SYSTEMS PROGRAMMERS – SYSTEMS ANALYSTS – DATA BASE ANALYSTS – SOFTWARE ENGINEERS, WHO HAVE THE EXPERIENCE IN ANY OF THE FOLLOWING AREAS:

IBM-MVS, CICS, COBOL, ASSEMBLER, TANDEM/TAL, IMS, IDMS, DB2, MODEL 204, C.

Our clients offer top salaries and a perfect climate. Please send resume or call any of our Florida locations.

•TAMPA
1 HARBOUR PLACE
#900T
TAMPA, FL 33602
(813) 229-5575

•FT. LAUDERDALE
5400 N. ANDREWS AVE.
#500
FT. LAUDERDALE, FL 33309
(305) 928-0811

•ORLANDO
111 N. ORANGE AVE.
#1150
ORLANDO, FL 32801
(305) 843-0765

•JACKSONVILLE
6 EAST BAY ST.
#510
JACKSONVILLE, FL 32202
(904) 358-6868

ROMAC

Professional Recruiters

All fees are assumed by our client companies.

MISSISSIPPI STATE UNIVERSITY Computing Center and Services is seeking applicants for a full-time Systems Programmer position. This person will be involved in installing and maintaining operating systems software for the university's mainframe computer systems, currently two UNISYS 1100/70's.

Minimum Acceptable Qualifications:

A bachelor's degree in Computer Science or a related field. Programming experience in a mainframe computer environment. Assembler language programming experience. Expertise in one or more high level languages such as Fortran, Pascal or C. SYSTEM V or BSD UNIX experience.

Additional Desirable Qualifications:

Experience on UNISYS 1100 mainframes. Systems programming experience on UNISYS 1100 mainframes. Exposure to local area networking concepts and technologies with emphasis on ETHERNET and TCP/IP.

The primary responsibility of this position is to install and support operating system software for the central mainframe computers used at MISSISSIPPI STATE UNIVERSITY for academic, research and administrative computing. Salary up to $30,000 commensurate with qualifications and experience.

Deadline for receipt of applications is May 13, 1988. Send vita/resume to:

Gerald A. Matthews, Director
Computing Center and Services
Mississippi State University
P.O. Drawer CC
Mississippi State, MS 39762

MISSISSIPPI STATE UNIVERSITY IS AN AFFIRMATIVE ACTION/EQUAL OPPORTUNITY EMPLOYER.

Senior Computer Systems Analyst wanted to analyze complex business and financial systems; design, develop and implement enhancements to Reject Reentry Check Processing software using COBOL and XEPL computer languages on Burroughs computer equipment, specifically the S4900 document Processor and the Burroughs B3900 mainframe; perform system's analysis and use structured design methodologies in the development of a new level of Burroughs Item Processing System (IPS) software. Requires Bachelor's degree in Computer Science or Business Administration and two years experience; $36,000.00 per year; 40 hours per week. Apply in person or by resume to Georgia Dept. of Labor, 1275 Clarendon Ave., Avondale Estates, GA 30002 Control #GA5263037 or to the nearest Georgia Job Service Center.

It's new! And it's the efficient way to recruit qualified computer professionals.

Now you can target your recruitment advertising to the qualified computer professionals you want to reach - where you want to reach them. All you need is the new IDG Communications Computer Careers Network. Here's how it can work for you:

You choose the newspapers. Depending on who you're looking for, you can select the combination of eight newspapers that best suits your needs - **Computerworld, InfoWorld, Network World, Digital News, Federal Computer Week,** and **Computer Currents**/Northern California, Southern California, Boston and Washington, D.C. Editions.

You choose the region. If you wish to recruit within a specific area, you can advertise in the regional editions of the newspapers you choose - East, West, or Midwest. Of course, national buys of individual newspapers or various combinations are also available when you need to extend your reach.

You don't pay for readers you don't want. Gone are the days when you have to worry about paying for waste circulation. The Computer Careers Network puts you in touch with qualified computer professionals - and only those qualified computer professionals you need to reach.

To put the new Computer Careers Network to work for you - regionally or nationally - call the sales office nearest you. Or contact John Corrigan, Recruitment Advertising Director, at 617-879-0700. And if you hurry, you can still get in on the special low introductory offer.

Sales Offices

John Corrigan, Recruitment Advertising Sales Director, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171; 617-879-0700.

BOSTON: 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171, Al DeMille, Regional Manager, Nancy Percival, Account Executive; 800-343-6474. (in Massachusetts, 617-879-0700).

NEW YORK: Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652; Warren Kolber, Regional Manager, 201-967-1350; Jay Novack, Account Executive 800-343-6474.

WASHINGTON, D.C.: 3022 Javier Road, Suite 210, Fairfax, VA 22031; Katie Kress, Regional Manager, 703-573-4115; Pauline Smith, Account Executive 800-343-6474.

CHICAGO: 10400 West Higgins Road, Suite 300, Rosemont, IL 60018; Patricia Powers, Regional Manager, 312-827-4433; Ellen Casey, Account Exective 800-343-6474.

LOS ANGELES: 18004 Sky Park Circle, Suite 100, Irvine, CA 92714; Barbara Murphy, Regional Manager, 714-250-0164; Chris Glenn, Account Executive, 800-343-6474.

SAN FRANCISCO: 18004 Sky Park Circle, Suite 100, Irvine, CA 92714; Barbara Murphy, Regional Manager, 714-250-0164; Chris Glenn, Account Executive, 800-343-6474.

HELP CREATE A MAJOR NEW MVS SYSTEMS SOFTWARE VENDOR

MVS Software, Inc., an investor-backed IBM mainframe systems software startup company, has the hottest product in the hottest new area in systems software: "Lights Out" (unattended) datacenter operation. Our product, Operations Productivity System/Multiple Virtual Storages (OPS/MVS), has been hailed as a "breakthrough product" by the Gartner Group and as the top product in the field by other industry opinion leaders. Now that we have the product, we need the technical people who will help us sell it, support it, and extend it.

Senior Software Developers

Design, program, and test new OPS/MVS functions and extend existing ones. You must have a deep understanding of MVS/XA and real talent for writing large programs in assembler language. Prior IBM mainframe systems software development experience in a vendor environment is strongly desired.

Senior Technical Support Analysts

Solve problems for our existing customers and answer questions for our prospective customers. You must have an in-depth knowledge of MVS/XA and/or one of its major subsystems such as IMS/DC or CICS. You must like working with people over the phone and be able to travel occasionally.

Senior Methodology Analysts

Work alongside our customers to revolutionize the way large MVS/XA datacenters are run. You must have a strong MVS, IMS/DC, or CICS systems programming background with a real feel for what actually goes on in a datacenter. You must be able to travel 50% to 75% in the early years.

WORK FOR MORE THAN A SALARY

Even though we have been in existence for over 2-1/2 years, we are still a startup company with all the challenges and potential rewards (and risks) that implies. All positions offer the chance for substantial capital gains from MVSI stock and the opportunity to receive substantial bonuses based on your own performance and MVSI's overall performance. We also offer the opportunity to work with some of the best people in the industry to find better ways of developing and supporting world-class software.

MVSI is currently Houston-based, but we will be relocating to **Los Angeles** shortly. Relocation assistance will be available. To respond send us something about yourself (handwritten OK) to:

MVS Software, Inc. 6464 Savoy Drive Suite 101 Houston, Texas 77036

Or call our Recruiting Hotline and leave a detailed message: **713-975-4286**

Computer Software Engineer wanted to analyze complex systems requirements; design, develop and implement accounting, order entry and billing systems and support existing systems on Burroughs Large Systems (A Series) using DMS II, LINC, and Advanced LINC and other Burroughs software products; Requires M.S. degree in Computer Science or Computer Engineering and one year experience in job offered or one year related experience as a Computer Systems Analyst/Computer Systems Analyst Trainee; $36,300.00 per year; 40 hours per week. Send resume to 7310 Woodward Ave., Room 415, Detroit, MI 48202. Ref. #25088 "Employer Paid Ad."

COMPANY WISE CAREER WISE

Valmont Is The Smart Move.

Revenues of $445 million. A fourfold earnings increase. A 1987 growth rate of 42%. We're Valmont Industries, Inc., a diversified, international manufacturer of fabricated steel products located near Omaha, Nebraska— offering Programmer/Analysts an intelligent career choice.

Our Information Services group is an integral component of Valmont's strategic growth objectives and we are making significant staff additions in the Application Development area to support our ambitious new application plan. We utilize an IBM 3090-180E computer, relational database technology and a fourth generation programming language.

It all means opportunity for exceptional and competitive individuals who possess:

- 2 years recent mainframe programming experience required preferably involving COBOL, DOS, CICS, VSAM, Datacom, Ideal and 4th generation languages in a manufacturing environment.
- Bachelor's degree or equivalent.

Make the smart move. We offer competitive salaries, a strong benefits program, relocation assistance, flexible scheduling, guaranteed continuing education and a modern corporate environment where suburban, rural, urban, and lakeside lifestyle options are available. For immediate consideration, send your resume, including salary history and expectations to: **File PLC-463, VALMONT INDUSTRIES, INC., Highway 275, Valley, NE 68064.**

VALMONT

An Equal Opportunity/Affirmative Action Employer
Only non-smokers will be considered.

ANALYST/PROGRAMMER: Developmt & maint of Carrier Access Billing Syst of major public utility firm w/reapons to include analysis, design, coding, testing, debugging, & implementation of new programs; syst testing, syst integration, syst conversion & project documentation. Programs written in DL/1 COBOL with IMS DB/DC as database with on-line & batch applications. 3 yrs exp or 3 yrs rel exp. Must Know: COBOL, OS/MVS, JCL, IMS DB/DC, DL/1, VSAM, TSO/SPF & large IBM mainframe hardware. $37,000/yr, 40 hr wk. Resume to: AJ-271, Pinkerton Computer Consultants, Inc., 20 Broad St., Suite 1302, New York, NY 10005.

DATABASE ENGINEER - Support database development. Require Bachelor's in Computer Science. Must be proficient with ORACLE, dBase III, Database design and data dictionary. Six months experience required. Salary: $30,000 per annum. Job location: New York, NY. Resume to: CW-B5052, Computerworld, Box 9171, Framingham, MA 01701-9171.

TWO POSITIONS AVAILABLE GRAPHICS SOFTWARE ENGINEER

Responsible for the software design and assembly language implementation of multiprocessor ReGIS (Remote Graphics Instruction Set) graphics CRT (Cathode Ray Tube) terminals. 40 hrs. wk. $30,750.00 annually. B.A. or B.S. degree with major in computer science. One year experience, either academic or in the work place, using **80186** assembly language implementation of multiprocessor ReGIS graphics CRT terminals. Send resume to MO JOB SERVICE, 505 Washington Ave., St. Louis, MO 63101, Attn: K. Gooch, Refer to Job Order Number 152866.

UNIVERSITY OF SOUTH FLORIDA COMPUTER SOFTWARE SPECIALIST INFORMATION CENTER

Responsible for support of academic computing projects at a major State Research University of 30,000 students and 1,800 faculty members. Multivendor environment including IBM 3033/VM and IBM 3081/MVS mainframes as well as various mini and micro computers in user departments. Will provide primary interface between University Computing Services and the academic community regarding faculty projects, and be actively involved in all major aspects of user assistance. Will assist and advise in meeting the information resource needs of academic users. Minimum qualifications: Bachelor's degree and 2 years progressively responsible data processing and/or programming experience. Must possess excellent verbal and written communication skills and excellent interpersonal skills, as well as a multi vendor computing applications background at the mainframe and micro levels. Preference will be given to candidate with an advanced degree, teaching/research experience, statistical and programming skills, and knowledge of the VM environment. Salary range: $19,440 to $35,000 (negotiable). Application deadline: May 26, 1988. Send resume to: **Joyce McKee, UCS, SVC 408, University of South Florida, 4202 East Fowler Ave., Tampa, FL 33620.**

Affirmative Action/Equal Opportunity Employer

DOCUMENTATION PROFESSIONALS

SEI is a dynamic, growth oriented company that provides information development and production services to the computer industry. We expect to fill 40 to 60 positions in the next 6 months in these categories: ● Documentation Manager ● Technical Writers ● Technical Editors ● Technical Marketing Representatives ● Automated Graphics Illustrators ● Programmers, (VM, MVS, DCF, C). Openings in all locations: ● Charlotte (704) 542-7100 and Raleigh (919) 461-0215 NC; Kingston, NY (914) 338-8379; Atlanta, GA (404) 980-9615; Denver, CO (303) 451-7722; and San Jose, CA (408) 280-1975. All experience levels are encouraged to apply. Call the SEI office nearest you or send resume and salary history to:

SEI Information Services
7725 Lisle Ave.
Charlotte, NC 28226
Attn: Personnel Coordinator-CW

EOE

LONG TERM LUCRATIVE CONTRACTS

IMMEDIATE OPPORTUNITIES IN THESE SPECIALTIES AND MORE

* IDMS SYS PROG/BAL
* VAX/BASIC/DBMS
* VAX/ACMS/TDMS
* DECNET SPECIALISTS
* SEC'S EDGAR PCKG-
* STRATUS SPECIALISTS
* SUN/SYBASE

CALL 212-766-4400

Mary Beth Walsh
* John Williams

SPECTRUM CONCEPTS
150 Broadway,
NY, NY 10038

CONSULTANTS & PERMANENTS

● HOGAN All Apps to $52K
● Banking - Loans, Savings, DDA 3090, OS/MVS, COBOL, BAL
● IMS DB/DC & DB2
● ADABAS-NATURAL

Systems Experience, Inc.
6033 W. Century Blvd.
Suite 260
Los Angeles, CA 90045
(213) 215-9000
(415) 543-6362

IBM SYSTEMS PROGRAMMER

To lead development team for a new 4GL software product. Initial assignment in Brazil (6 months) then return to Jacksonville. Requires 5 years experience, ASSEMBLER, DB/DC knowledge. Unique opportunity for highly skilled tech. Send resume in confidence to:

JACKSONVILLE SOFTWARE
8501 Arlington Expressway
Suite B101
Jacksonville, FL 32211

SYSTEM 36 RPGII

Liberty Management Systems a rapidly growing IBM Industry remarketer in the Pittsburgh area, Americas most livable city, has an opening for a Programmer with a minimum of 2 years experience. Duties include systems maintenance program development, client troubleshooting, systems installation and training. National travel opportunities approximately 20% of time. We are a leader in our vertical market. Send resume and salary requirements to:

Gary Kravitz
Liberty Management Systems
PO Box 463
Carnegie, PA 15106
or call 412-279-0092

COMPUTER SPECIALIST

Assist VA Medical Center ADP Site Manager in implementing a patient data system based on MUMPS. Debugging, customizing, developing special applications. 8:00 - 4:30 M-F, occasional overtime. Beautiful upstate New York rural community with easy access to Rochester, NY, urban delights. $27,716 to start, potential to $36,032. Promotion opportunities throughout the nation in the largest hospital system in the country. Call the Recruiting Office, (716) 394-2000, ext. 3709/3710 or write: VA Medical Center, (05) Canandaigua, NY 14424. A Federal competitive civil service position. EEO Employer.

ENGINEER

CLARIS

Macintosh Developers

At CLARIS, Apple's new software subsidiary, we've introduced MacDraw II™, MacProject II™, MacWrite 5.0™, and MacPaint 2.0™. Now, we're actively working on new applications development and ongoing upgrade efforts.

There's a lot going on and more to be done. If you're a creative, hands-on engineer or manager with text, graphics, and/or database software development experience, consider these opportunities to develop Macintosh™ applications.

Engineering Project Managers

You'll work with third-party software developers to define product specifications and manage development on new graphics and advanced graphics applications.

You'll need a BS/MS in electrical engineering or computer science with 2-5 years' experience developing software and/or managing software development, and knowledge of a combination of C, Pascal, bit-mapped graphics, advanced graphics and Macintosh software development.

Graphics Software Engineers

You'll work on new applications development as well as the next generation of our graphics products.

You'll need a BS/MS in electrical engineering or computer science, 2-5 years' experience developing software, and knowledge of a combination of C, Pascal, 68000 Assembly language, bit-mapped graphics, and Macintosh software development.

Macintosh Technical Specialists

You'll work with internal and third-party developers to build new applications, solve technical problems and/or localize products for international markets.

You'll need a BS/MS and 2+ years' experience writing Macintosh software. Project management/foreign language skills a plus.

If you are motivated by direct involvement and the opportunity to make a meaningful contribution in a dynamic development environment with a unique start-up, send your resume with SALARY HISTORY AND REQUIREMENTS to CLARIS Corporation, Dept. 4-27, 440 Clyde Avenue, Mountain View, CA 94043. EOE. Principals only; no phone calls, please.

MARKETING

2 marketing openings at INFOTRON

. . . a leading supplier of complex communications systems for networking

X.25 ● LAN

These are brand-new positions resulting from growth . . . calling for complete, in-depth development and execution of marketing plans addressing the Packet and LAN marketplaces.

Both positions call for experience in product management and market planning. The X.25 opening calls for in-depth knowledge of the Packet marketplace and products. The LAN opening calls for a similar in-depth knowledge of LAN activities.

Our highly competitive compensation package includes benefits that go far beyond the ordinary major medical policy, such as a liberal prescription-drug program, tuition reimbursement, a 401(k) savings plan, and more.

If you qualify, please apply by sending your resume, with salary history, to: **Bob Witkoski, Sr. Employment Rep., Infotron Systems Corporation, Cherry Hill Industrial Park, Building #9, Cherry Hill, NJ 08003.** EOE M/F/H/V.

INFOTRON SYSTEMS

MARKETPLACE

Worldly personal computers

Demand for IBM PC AT, Compaq Deskpro 286 spans the globe

BY CAMERON HALL
BOSTON COMPUTER EXCHANGE CORP.

Contacts from the other side of the world indicate that the Soviets are getting ready for glasnost to assimilate the information revolution. Despite the lack of hard currency, an increasing number of Eastern bloc buyers are expressing interest in buying older model personal computers from the secondary market.

Although the U.S. Department of Commerce still requires an export license to take an antique 1981-model PC out of the U.S., Soviet buyers are willing to wade through the red tape to get a "thought appliance" into their country.

"I really want an IBM, but I'd take any chip off the Eastern bloc," one Czechoslovakian buyer said. What could be better for America than to export this technology? It is like seeding the world with a technology that fosters the freedoms of the First Amendment.

Where are those ATs?

The velocity of trade on the Boston Computer Exchange Big Board took another leap during the week ended April 22, as buyers and sellers could view the exchange's data base on Compuserve. More than 400,000 Compuserve users are now able to search for bargains and post their equipment for sale. Among the first questions over the electronic mail lines was "Where are the IBM Personal Computer AT Model 339s?"

IBM demand was met with supply, as the last of the PC XT and AT lots from IBM began to filter through the market, and prices were down as a result. The XT Model 089 fell $50 to close at $1,650, and the ATs were also down across the board.

The early PC and PC XT models and the Personal System/2s continued to trade at last week's prices. Volume lots of IBM hardware also became available from corporate and government offices, and they quickly found new homes in large corporate installations with custom hardware and software that require true Blue AT equipment.

The Compaq Computer Corp. market was quiet. Compaq saw one gainer and two losers as all other models held steady at the previous week's close.

The ever-popular Compaq Portable I was up $25 to close at $825, remaining in the trading range of last month as it matched the IBM PC competition virtually machine for machine in sales.

The Compaq Portable II 20-MHz machine was down $50 to close at $2,100. There were bargains to be had, as the 20-MHz Deskpro provided great value selling down $100 at $1,400.

THE END OF THE college year is approaching, and the Macintoshes purchased for term papers suddenly look like an opportunity for cash.

Summer supply

Apple Computer, Inc. Macintosh market prices were stable under poor supply conditions all week, with buyers hoping student Macintoshes will come to market in volume in the next few weeks. The end of the college year is approaching, and the Macintoshes purchased for term papers suddenly look like an opportunity for cash.

Constrained by supply, the Apple Macintosh 512 was up $75, the 512E sold at the previous week's close, and the Mac Plus held its own just below new discounts. The Mac SE dropped slightly from last week's high to close down, at $2,375.

The Mac IIs are getting popular in the leasing market, as those with whole Macintosh departments lease high-end equipment, and prices were up $100 for the machines, which sold at $3,900.

The Boston Computer Exchange can be reached at 800-BOCOEXX or 617-542-4414 in Massachusetts.

The BoCoEx Index

Closing prices report for the week ending April 22, 1988

	Closing price	Recent high	Recent low
IBM PC Model 076	$825	$900	$600
XT Model 086	$1,225	$1,350	$900
XT Model 089	$1,650	$1,700	$1,125
AT Model 099	$2,350	$2,400	$1,875
AT Model 239	$2,650	$2,750	$2,150
AT Model 339	$3,650	$3,700	$2,750
PS/2 Model 50	$2,475	$2,650	$2,400
PS/2 Model 60	$2,650	$2,800	$2,475
Compaq Portable I	$825	$900	$575
Portable II	$2,100	$2,150	$1,600
Portable III	$3,200	$3,200	$2,700
Plus	$1,175	$1,275	$850
Deskpro 20-MHz	$1,400	$1,500	$1,000
Deskpro 286	$2,425	$2,475	$1,850
Deskpro 386	$4,075	$4,000	$3,475
Apple Macintosh 512	$725	$750	$575
512E	$850	$1,075	$675
Plus	$1,150	$1,350	$900
SE	$1,925	$2,200	$1,600
SE 20-MHz	$2,375	$2,400	$2,100
II	$3,900	$4,200	$3,500
Apple Laserwriter Plus	$3,100	$3,500	$2,500
Hewlett-Packard Laserjet	$925	$925	$725
NEC Multispeed EL	$900	$900	$700

INFORMATION PROVIDED BY THE BOSTON COMPUTER EXCHANGE CORP.

Used Equipment

HONEYWELL
LEVEL 6 DPS 6 SERIES 16
- Complete Minicomputer Line New & Used
- All Peripherals and Terminals
- Upgrades and Features
- Depot Repair Capability
- Honeywell Maintenance Guaranteed
- Immediate Delivery Low Prices
- DPS 6 Compatible Laser Printers
- HDS 5 and HDS 7 Compatible Terminals

The Recognized Leader in Honeywell Minicomputer Sales and Support

BCS
BOUDREAU COMPUTER SERVICES
100 Bearfoot Road
Northboro, MA 01532
(617) 393-6839
TWX 710-347-7574
FAX 617-393-3781

DEC VAX & PDP 11
BUY-SELL-NEW-USED
Systems, Peripherals, Options available for sale
Looking to purchase VAX and PDP 11 Systems, Hardware
LAKEWOOD COMPUTER CORP.
438 Link Lane
Ft. Collins, CO 80524
(303) 493-6406 FAX: (303) 493-6409
dda

BUY • SELL • SAVE $
IBM DISPLAYWRITERS REPAIRS
36'S, 38'S
Printers & Terminals
IBM 5525 Systems
5219 Printers 5253-1 Terminals
• DEC • WANG •
• NBI • XEROX •
LRK RESOURCES UNLTD INC.
713-437-7370
800-231-8901

4341 - 4381
Buy - Sell - Lease
Trade-in
Systems and Peripherals
Hawkes Bay Computer
(408) 866-1020

We buy, sell & rent used Wang Systems & Parts
Used WANG Specials
VS 85/90/100 1 MB Memory Board.....$1995.
OIS 50.....3495.
128K Memory Board (2200).....495.
VS15 & VS65 Users: 147MB Disk-Drive (Wang upgrade = LU3296).....3995.
2236 MXE (2200).....550.
2265 V-2 (288 MB) Disk Drive.....4495.
VS5 & VS6 Users: 67MB Disk Drive-(Wang upgrade = LU3440).....3495.
OIS 140-3.....4495.
Norcomex Ltd.
34 Futurity Unit 17
Concord, ON L4K 1S6
(416) 738-0803
Telex: 06-966391 Fax: (416) 738-9013

Appearing In the COMPUTERWORLD MARKETPLACE
- Closing Prices Report On New and Used Equipment
- Market Trends And Analysis
- Fair Market Value Data
- Computer And Software Training

Reach The Decision Makers As They Reach For Computerworld Each Week

To Place Ad, Call:
Midwest: (617) 620-7758
West: (617) 620-7759
Northeast: (617) 620-7784
East: (201) 967-1358

Used Equipment

BUY OR SELL
NEW OR USED
IBM PC * XT * AT * PS/2
COMPAQ * HP * AT&T * WANG
MACINTOSH * APPLE 2

1-800-262-6399

Boston Computer Exchange Corporation
MA 617-542-4414
FAX 617-542-8849

IBM SPECIALISTS

SELL • LEASE • BUY
S/34 S/36 S/38
3741 3742

- New and Used
- All Peripherals
- Upgrades and Features
- IBM Maintenance Guaranteed
- Immediate Delivery
- Completely Refurbished

800-251-2670
IN TENNESSEE (615) 847-4031

CMA
COMPUTER MARKETING
of America, Inc.
PO BOX 71 • 610 BRYAN STREET • OLD HICKORY, TENNESSEE 37138

• Buy • Sell • Lease • Rent

IBM. PC's
5150 — 5160 — 5170 — 5171
IBM Displaywriters
5525 — OFFICE SYSTEMS
5219 — 5253 — 5258
6670 PRINTERS
SYSTEM/34/36
WITH ALL PERIPHERALS
WE CONVERT 5219-B02's
TO D02's

CDB FINANCIAL, INC.
3520 DILIDO ROAD
DALLAS, TEXAS 75229
800-648-6791
214-324-3451

IBM Unit Record Equipment
Data Modules/Disk Packs
Magnetic Tape/Diskettes

029-082-083-084-085-088
129-514-519-548-557-188

2316-3336(1)&(11)-3348(70)
80-200-300 MB
Disk Packs

Thomas Computer Corp.
5838 W. Howard Chicago IL 60648
800-621-3906 312-647-0880

IBM 3090 - 150E
Available June 1988
For Sale or Lease
Private Company
IBM Maintained
Interested Parties
Reply to CW-B5048
Computerworld
Box 9171
Framingham, MA 01701-9171

FOR SALE
- PERKIN ELMER
XF600 CPC (512KBMOS-16 ports)
2 80 MB Disk Drives w/controller
8 80 MB Disk Pks
Printronix 300 LPM System Pntr.
12 Qume (QVT-101) CRT's
1 Diablo LQ Pntr w/tractor fd.
1 8 CNL MACC Board
1 Decimal/Arithmetic Bd.
1 1200B Originator/Ans Modem, (RACAL-VADIC)
LIEBERT A/C MODEL AU 27AP-L
REPLY BY BID ONLY PLEASE to:
Dept. LRG, 185 Madison Ave, 10th Floor, New York, NY 10016

SALE OR LEASE
IBM CPU's

3084 - Q64	NOW
3090 - 150	3/1/88
3081 - GX2	NOW

Call:
GTEX Financial Group
(214) 783-1212

Digital WANTED!

FOR IMMEDIATE PURCHASE

HSC5X-BA	CLUSTER EQUIPMENT	RA-81's	RA-60's	MICROVAX ALL TYPES

DESCRIPTION: This equipment is on **Merida's** most wanted list.

8200-8750
COMPLETE
SYSTEMS

CAUTION: Ideally the equipment should be under a DEC maintenance agreement but this is negotiable.

REWARD: Merida pays **immediately** on receipt of equipment via certified check, wire transfer or money order. **Merida** normally picks up the equipment in its fleet of air-ride vehicles the same day it is deinstalled. **Merida** assumes all responsibility for insurance.

If you have information on used or surplus equipment that you wish to liquidate for top dollar, call immediately.

dda
DIGITAL DEALERS ASSOCIATION
CDLA Member
4C Gill Street
Woburn, MA 01801
(617) 933-6790
FAX 617-933-7884

Merida TRADING GROUP

Digital and DEC are registered trademarks of Digital Equipment Corp.

WANG
PRIME
MICRODATA
HONEYWELL
HEWLETT-PACKARD

CRC

BUY, SELL, LEASE, TRADE

23950 Commerce Park, Beachwood, Ohio 44122
(216) 292-0635 Fax: 216-292-4838 Telex: 205129

CRC is a Trademark of Computer Remarketing Corporations

Used Equipment

WANG

Buy • Sell
MVP/LVP • OIS
VS • PC
System in Inventory
VS-6, 65, 85, 100
OIS - 60,80
4230-A

GENESIS
EQUIPMENT MARKETING
GEM

602-277-8230

POINT OF SALE

Barcode • Scanners
IBM
526X • 368X • 468X
Call Richard Crenshaw
800-238-6405
In TN 901-372-2622
FAX 901-373-5796

CB COMPUTER BROKERS INC.
2978 Shelby St.
Memphis, TN 31834

Member American Society Of Computer Dealers

BUY SELL & LEASE

IBM System
34 • 36 • 38
4300

Oakland Computer Services
P.O. Box 1144
S. Lancaster, MA 01561
800-544-2275

DEC PDP-11
SYSTEMS & PERIPHERALS
BUY & SELL

THE One-Stop EXCHANGE!
• CPUS • TERMINALS
• DISC DRIVES • PRINTERS
• INTERFACES, ETC.

dce DIGITAL COMPUTER EXCHANGE INC
27773 Industrial Blvd., Hayward, CA. 94545
FAX (415) 887-6500 TLX 709838

Call (415) 887-3100

IBM 3725/26

AVAILABLE NOW

PURCHASE OR LEASE

contact Bill Lane

SMI

Systems Marketing Inc.
3610 North 44th Street
Phoenix, Arizona 85018
602-468-9800

BUY - SELL
BURROUGHS

All Processors, Printers
Tapes, Disks, Terminals

Competitively Priced
Immediate Delivery

Computer Equity Organization
(303) 825-2041

Building a Data Center?

We Buy/Sell & Install Used Computer A/C, Power: UPS's, MG's, PDU's, Access Floors and Halon. Chuck

713-789-4610

Computerworld's MARKETPLACE section

Looking for a way to reach information systems professionals with your advertising message?

Call a Computerworld product classified sales representative for all the details on the new Marketplace sections.

(617) 620-7758
(617) 620-7759
(617) 620-7764
(201) 967-1358

COMPUTERWORLD

Training Sections

Turn to the Training section of COMPUTERWORLD's issues for an interesting editorial feature addressing these and other questions.

5/9 Mainframe vs. micro computer-based training. What are the pros and cons of these approaches?

5/23 The cost of setting up an in-house training center. What do you need and how do you justify paying for it?

6/6 The advantages and disadvantages of telelraining. How costly and useful is it to broadcast instructor-lead sessions to remote locations?

6/20 Choosing a training consultant/vendor. Some criteria for making sure the person/company you hire can provide the services you need.

Call for more information

617-620-7794

Advertise your computer-related products and services in a MARKETPLACE that's over 612,000 strong.

Computerworld's newly expanded and improved product classified MARKETPLACE gives you 10 new ways to advertise your products or services to a receptive audience of over 612,000 computer professionals every week:

- Used Equipment
- Hardware
- Software
- Communications Equipment
- Rental and Leasing
- Time and Services
- Supplies
- Bids and Proposals
- Financial/Business Services
- Training

MARKETPLACE delivers readers! In addition to the wide selection of ads, *Computerworld* readers are drawn to MARKETPLACE for information on market trends and computer and software training. Plus a Closing Prices Report on new and used equipment, and "Fair Market Value" — a statistical summary from International Data Corporation.

Telecopier service. To run your MARKETPLACE ad, just call (800) 343-6474, ext. 739 or 740, in Massachusetts call (617) 879-0700, ext. 739 or 740.

So be in the right place — *Computerworld* MARKETPLACE — when your customers go shopping. Call today for more information on advertising your products or services.

COMPUTERWORLD

An IDG Communications Publication

MARKETPLACE Sales Offices
Massachusetts: 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171, (617) 879-0700, ext. 758 or 759.
New Jersey: Paramus Plaza I, Route 17 North, Paramus, NJ 07652, (201) 967-1350, ext. 409.

At last we can see the earth as it really is. This small, pale ball floating in the vastness of space. Clearly with limits. Vulnerable, fragile.

For almost 100 years the Sierra Club has been fighting to protect the earth's fragile systems. We have successfully lobbied for laws to limit air and water pollution and to regulate poisonous toxic chemicals. We have won protection for swamps and meadows, rivers and mountains, deserts and prairies . . . those natural places which permit the earth to heal and renew itself. We have consistently been an effective voice for a world healthful for all its inhabitants.

The unique power of the Sierra Club springs from our active grass roots membership. . . volunteers who give freely of their time and expertise. If you want to participate in this work, or share in the satisfaction of it through a supporting membership, contact the Sierra Club, 730 Polk Street, San Francisco, CA 94109, (415) 776-2211.

SIERRA CLUB

Used Equipment

HP 3000

7933H

Available in Quantity

Processors • Peripherals Systems

All In Stock - Immediate Delivery

All warranted to qualify for manufacturer's maintenance

BUY • SELL • TRADE
RENT • LEASE

ConAm Corporation

It's Performance That Counts!

800/643-4954 213/829-2277

We've Got You Covered

Small To Mid-Size Systems

- S/36, S/38, 9370, SILVERLAKE
- All Upgrades & Peripherals
- Customized Leasing Packages
- Lease, Buy, Or Sell
- Immediate Delivery
- Buy-Back Program
- Equipment Refurbished & Maintenance Guaranteed
- Technical Systems Support
- Distributor For Memorex, LOCOM, & EMC²

NEPTUNE
MARSHALL LEWIS DIVISION

For Small To Mid-Size Systems Call
1-800-426-8733 (714) 641-0366 (In CA)

Large Systems

- 4381, 308X, 3090
- Non-IBM (Amdahl, NAS & More)
- Peripherals & Communication Equipment
- Customized Leasing Packages
- Mid-Lease CPU & DASD Upgrades
- Lease, Buy, Or Sell
- Immediate Delivery
- Equipment Refurbished & Maintenance Guaranteed

NEPTUNE
For Large Systems Call (203) 356-9282!

IBM, Memorex, LOCOM, & EMC² are registered trademarks of International Business Machines Corporation, Memorex Corporation, LOCOM Corporation and EMC² Corporation respectively.

Now from One Source!

digital IBM

BUY, SELL, LEASE, TRADE

Systems, Disk Drives, CPU's, Memory, Printers, Modules, Controllers, Tape Drives, Spares, Communications, Terminals

All equipment eligible for DEC or IBM maintenance.

CSI Comprex Systems, Inc.
Call Toll-Free 1-800-426-5400
In Mass. 617-344-8600
FAX 617-344-4199

IF YOU'RE BUYING, WE'RE SELLING

36 38 4300

IF YOU'RE SELLING, WE'RE BUYING

IBM SYSTEMS
Buy • Sell • Lease PERIPHERALS

(800) 331-8283
TOLL FREE

(213) 306-9343
CALIFORNIA

Ocean Computers, Inc.
8055 W. Manchester Ave., Ste 525
Playa Del Rey, CA 90293

CDLA

MISSISSIPPI CENTRAL DATA PROCESSING AUTHORITY

Sealed proposals will be received by the CDPA, 301 N. Lamar St., 301 Building, Suite 508, Jackson, MS 39201 for the following equipment and services:

Request for Proposal No. 1345, due Monday May 23, 1988 at 3:30 p.m. for the acquisition of a new or refurbished replacement processor for the IBM System/36 in administration at COAHOMA JUNIOR COLLEGE. No charge.

Request for Proposal No. 1346, due Thursday, May 26, 1988 at 3:30 p.m. for the acquisition of 60 MS-DOS/OS2-based microcomputers, related peripherals and software for the MISSISSIPPI STATE HIGHWAY DEPARTMENT. Charge $10.00.

Request for Proposal No. 1347, due Thursday, May 26, 1988 at 3:30 p.m. for the acquisition of an upgrade to an NCR Tower XP for MISSISSIPPI LEGISLATIVE PERFORMANCE EVALUATION EXPENDITURE REVIEW COMMITTEE. Charge $10.00.

Request for Proposal No. 1348, due Tuesday, May 24, 1988 at 3:30 p.m. for the acquisition of a MS/DOS-based animation system with two-dimensional and three-dimensional capabilities for HINDS COMMUNITY COLLEGE. No charge.

Request for Proposal No. 1349, due Tuesday, May 31, 1988 at 3:30 p.m. for the acquisition of an upgrade and replacement for an existing Hewlett-Packard data acquisition and control system for the Magnetohydrodynamics Energy Center at MISSISSIPPI STATE UNIVERSITY. No charge.

Request for Proposal No. 1350, due Friday, May 13, 1988 at 3:30 p.m. for the acquisition of a departmental minicomputer or microcomputer-based local area network with full SNA communications for the MISSISSIPPI ETHICS COMMISSION. Charge $10.00.

Request for Proposal No. 1351, due Monday, May 16, 1988 at 3:30 p.m. for the acquisition of three local area networks, MS/DOS-based microcomputer workstations, peripherals and software for the MISSISSIPPI DELTA COMMUNITY COLLEGE. Charge $10.00.

Detailed specifications may be obtained free of charge from the CDPA office or at the specified cost by submitting a written request accompanied by the appropriate payment. NOTE: Valid forms of payment are corporate check on a Mississippi bank, certified check or POSTAL money order. NO CASH OR OUT-OF-STATE CHECKS. The CDPA reserves the right to reject any and all bids and proposals and to waive informalities.

Patsy Stanley @ (601) 359-2604

IBM BUY · SELL · LEASE

36 38 4300 SERIES 1

- Processors
- Peripherals
- Upgrades

DEMPSEY & ASSOCIATES Inc.

18377 Beach Blvd., Suite 323 • Huntington Beach, CA 92648 (714) 847-8486
(800) 888-2000

WANTED TO BUY

BURROUGHS CP 9500

Please Contact:
David Lamb

(203) 723-7487

WANTED

OBSOLETE COMPUTER EQUIPMENT

Top Cash Paid

We purchase all types of obsolete or excess computer equipment and peripherals. We pay costs for all shipments as well as top prices.

Call today for a quote on your system.

COMPU-SCRAP, Inc.
Randolph, MA 02368
(617) 341-2695
Call Collect!

PRIME

EXPERIENCED SYSTEMS AND PERIPHERALS

BUY-SELL-LEASE-BROKERAGE

NEW PLUG-COMPATIBLE DISK, TAPE, MEMORY

PLUS
THE FASTEST I/O AVAILABLE ANYWHERE

1ST SOLUTIONS, INC
11460 N CAVE CREEK ROAD
PHOENIX, AZ 85020
602-997-0997
ASK FOR DON SHIFRIS

55 PAGE 4381 ANALYSIS

FREE
TO IBM USERS

marketex
SALES AND SUPPORT
800 426-4381
CA 408 241-3677

BUY - SELL - LEASE

IBM

4381

ASK FOR MIKE DEDLER

New York Systems Exchange
Melville, New York

CDLA Area Code: **516** **673-3830**

FOR SALE HONEYWELL

DPS6-95, 8MB EDAC, 590MB Disk, 64MB Streamer, 600 LPM band printer, 32-bit controller.

Purchased new January 1987. For a contract that did not materialize. Total usage less than 100 hours. Site inspection of equipment by appointment only.

Asking $135,000
Interested in quick sale

Call 914-354-1933
ask for Allan

Desk Top Publishing

"NOBODY"

We asked our customers to tell us who had LOWER PRICES than we did.

They told us ...

That's because we lead the industry both in price and quality in ½" 9-track tape drive subsystems to transfer information between mainframes and PC/XT/AT, PS2.

- *EBCDIC-ASCII Conversion*
- *Tape backup/volume data storage*
- *Transfer speeds up to 7 MEG/Min.*
- *Option to select and reject specific fields*
- *800/1600/6250 BPI*
- *Drives from Anritsu, Cipher, Qualstar and M4 Data*
- *Free technical support*

Dealer & Volume Discounts

FLAGSTAFF ENGINEERING

1120 Kaibab Lane • Flagstaff, AZ 86001
(602) 779-3341 • Telex 705809
FAX (602) 779-5998

Bid & Proposals

Sealed bids will be received by the San Diego Transit Corporation, Purchasing Department at its offices, 100 16th Street, San Diego, California, 92101 until 11:00 A.M., on May 24, 1988 at which time bids will be publicly opened and read for the following:

ONE (1) UNINTERRUPTIBLE POWER SYSTEM

In accordance with the Corporation's specifications: #198. Bids shall be submitted on the proposal forms furnished by the Corporation enclosed in a sealed envelope, plainly endorsed with bidder's name and marked:

UNINTERRUPTIBLE POWER SYSTEM
SDTC BID #198
BID OPENING: 11:00 A.M., May 24, 1988

Copies of bid specifications may be obtained from Tessie Peje, Purchasing Department, 100 16th Street, San Diego, California, 92101, Phone: (619) 236-0100 Ext. 495.

The San Diego Transit Corporation hereby notifies all bidders that in regard to any contract entered into pursuant to this advertisement, disadvantaged business enterprises will not be subjected to discrimination on the basis of race, color, sex or national origin in consideration for an award.

The Corporation reserves the right to reject any and all bids and to re-advertise for bids.

METROPOLITAN TRANSPORTATION AUTHORITY NOTICE OR SALE is hereby given that the Metropolitan Transportation Authority will receive sealed bids for the sale of the items listed below, and that the bids will be publicly opened and read at the date and time specified below at the MTA's offices at 347 Madison Avenue. Bids must be submitted on an inquiry form provided by the MTA. A copy of such form and the terms and conditions of sale may be obtained Procurement Services Bid Desk 5th floor Metropolitan Transportation Authority, 347 Madison Ave., NY, NY 10017.

INQUIRY NO.	DATE	TIME
4-01-88129-0	May 26, 1988	2PM

ITEMS: Communications Equipment:
Two IBM 3705-K04 and three 3706-K04 each with an assorted compliment of added IBM features

METROPOLITAN TRANSPORTATION AUTHORITY

NOTICE is hereby given that the Metropolitan Transportation Authority will receive sealed bids for the sale of the items listed below, and that the bids will be publicly opened and read at the date and time specified below at the MTA's offices at 347 Madison Avenue. Bids must be submitted on an inquiry form provided by the MTA. A copy of such form and the terms and conditions of sale may be obtained from Donald C. Noll, Manager of Contracts, Metropolitan Transportation Authority, 347 Madison Ave., NY, NY 10017.

INQUIRY NO.	DATE	TIME
4-01-88129-0	May 19, 1988	2PM

ITEMS: Two IBM 3705-K04 and three 3706-K04 each with an assorted compliment of added IBM features

REQUEST FOR PROPOSALS

The Director of Procurement and Contract Administration of the South Florida Water Management District (District), 3301 Gun Club Road, P.O. Box 24680, West Palm Beach Florida, 33416-4680, will accept proposals for a project for the development of a MODCOMP, VAX communications link.

All proposals must conform to the instructions in the Request for Proposals. Interested proposers may obtain a copy of the complete Request for Proposal at the above address or by calling 305-686-8800, Extension 222.

The Director of Procurement and Contract Administration will receive sealed proposals up to the 2:00 P.M. opening time on June 2, 1988.

It's NEW...

It's the place to shop ...

Computerworld MARKETPLACE

Software

FOR SALE
LEX 9A
WORD PROCESSING PROGRAM
VAX VMS VERSION

Includes spell program, tutorial and 1 year of maintenance (includes upgrades & phone support).

ALSO INCLUDED ARE:

5 user manuals
6 spelling manual
1 technical manual
1 training manual
& misc. templates

Would like $6500

(has never been used, & is fully licenseable through U.S. distributor)

CONTACT KEVIN
(602) 438-0559

GET MORE VAX DISK SPACE

WITHOUT BUYING MORE DISKS!

REQUIRES NO MODIFICATIONS TO EXISTING SOFTWARE!

Write or call for info...

medcom Information Systems, Inc.
6312 E. Santa Ana Canyon Rd, Suite 361
Anaheim Hills, CA 92807
Ask For Bob (714)974-1564

***MARKETPLACE* is Here!**

Reach Over 512,000 Computer Professionals!

Call for all the details

(617) 879-0700 ext. 758, 759, 784
(201) 967-1358

Rental & Leasing

BURROUGHS
UNISYS

B20 - B7000
A Series - V Series
All Peripherals

Low Lease Rates
Depot Maintenance

COMPUTER PROVISIONS CORPORATION

800-832-4664

VAX RENTALS

MICROVAX II
VAX 700 SERIES
VAX 8000 SERIES
Systems & Peripherals

- Fast Turnaround
- Dependable Products
- Upgrade/Add-On Flexibility
- Purchase Option Available

3 Months • 6 Months • 12 Months

BROOKVALE ASSOCIATES
dtb Digital Dealers Association

(516) 273-7777 (206) 392-9878

FOR RENT

IBM
&
COMPAQ
PC ● XT ● AT
Deskpro/Portable

1 Month - 3 Years

THE COMPUTER TRADERS
404-980-9233
FAX 404-951-2573

We Rent & Lease
DEC
Systems
Components

Digital Computer Lease
call:713 445-0082
600 Kenrick Ste C22
Houston, Tx 77060

Computerworld's MARKETPLACE section

Looking for a way to reach information systems professionals with your advertising message?

Call a Computerworld product classified sales representative for all the details on the new Marketplace sections.

(617) 620-7758
(617) 620-7759
(617) 620-7784
(201) 967-1358

You Have 10 Ways To Advertise Your Products In The *MARKETPLACE*

Featuring:

☐ Used Equipment	☐ Hardware
☐ Software	☐ Communications Equipment
☐ Rental & Leasing	☐ Time & Services
☐ Supplies	☐ Bids & Proposals
☐ Training	☐ Financial Business Services

Reach over 612,000

Information Systems Professionals each week

Name:_____

Title:_____

Company:_____

Address:_____

City:_____

State:_____ Zip:_____

☐ I am enclosing ad material with this form

Ad size:

_____ columns wide x ____ inches deep.

Return this form and advertising material to:

Computerworld Product Classified

Marketplace

375 Cochituate Road, Box 9171
Framingham, MA 01701-9171

or call a representative today for all the details:

East: (201) 967-1358
Midwest: (617) 620-7758
Northeast: (617) 620-7784
West: (617) 620-7759

Peripheral Equipment

AIR ROVER COMPANY
PORTABLE SPOT COOLING SYSTEMS
REFRIGERATED AIR

AVAILABLE SIZES
1-5 TONS
- AIR COOLED (no water necessary)
- 1 TON PLUGS INTO 110 VOLT OUTLET
- THERMOSTATIC CONTROL
- HOT GAS BYPASS (11,000 - 60,000 BTU's)
- PORTABLE - ROLLS THROUGH STANDARD DOOR OPENINGS

1 TON MODEL SHOWN

IDEAL FOR
- COMPUTER ROOMS • PBX and ELECTRONIC EQUIPMENT ROOMS
- OFFICES • FACTORIES and
- REMOTE LOCATIONS

GREAT FOR
AFTER HOUR, WEEKEND, SUPPLEMENTARY and EMERGENCY COOLING

AIR ROVER COMPANY
1 (214) 877-3430
or FAX 1 (214) 877-2793
EAST TEXAS CENTER • ROUTE 1
• BOX 280 • TYLER, TEXAS 75708

Conversion

SMOOTH CONVERSIONS

DIGITAL:	PDP 11 to VAX
IBM:	DOS to OS
IBM:	SYS 36 to 38 to Silverlake
UNISYS:	Small - Medium to A/V Series

PCS
404-432-3833
3020 Atlanta St
Smyrna, GA 30080

Computerworld's MARKETPLACE section

Looking for a way to reach information systems professionals with your advertising message?

Call a Computerworld product classified sales representative for all the details on the new Marketplace sections.

(617) 630-7758, 7759, 7784
(201) 967-1358

Time & Services

COMPUTER TIMESHARING
- We broker computer time.
- We find your lowest prices
- Nationwide service since 1968.
- All mainframes.
- NEVER a charge to the Buyer.
- Our fees paid by the Seller.

Call Don Seiden at
Computer Reserves, Inc.
(201) 688-6100

COMPUTER TIME
DEDICATED CPU (4341-2)
With peripherals
Convenient NJ location
$65. per wall-clock hour (4 hour minimum)
Call
Dennis Shedlock
(201) 548-5800

We Share
We offer Mainframe computing services:
IBM
308X, MVS/XA, CICS, TSO, VM
DATABASE
ADABAS/NATURAL, DB2
VAX VMS
HP MPE/V
We make your job easier by offering:
■ Nationwide Data Access ■ Volume Discounts ■ High Speed Laser or Impact Printing ■ Mailing Services
1-800-654-9347
Weyerhaeuser Information Systems

TIMESHARED SUPERCOMPUTING
INTERACTIVE OR BATCH PROCESSING FOR TECHNICAL APPLICATIONS
- Low Rates for Disk Storage, Vector Processing, and Connect Time
- CONVEX Supercomputer
- UNIX, with VAX/VMS and CRAY Compatibility Features
- Vectorizing Development Tools
- Engineering Analysis Software
- Numerical Optimization Codes
- Up to 19,200 baud Dialup Lines

MODELING AND COMPUTING SERVICES
1153 Bordeaux Drive, Suite 107
Sunnyvale, CA 94089
(408) 745-1124

NOTECH
Innovative Computer Techniques
COMPUTER SERVICES
IBM 3084
● Batch Processing ● Public Network Access
● Timesharing ● Laser Printing
Route 202, Raritan, N.J. 08869
201-685-3400
Contact: Joyce Bogsenko

TIMESHARE
MVS - VM - DOS
- Save 25% on current charges
- Full Service - 24 Hours
- Laser Printing
- Data Entry
- All Communications
- Tymnet - XCOM 6.2

Call: Ted Moulder
1-800-422-3220
STAFTAB Established 1936

How to increase your power without paying the price.

Turn to Manufacturers Hanover Data Services Corporation for low-cost, state-of-the-art timesharing and information Center services

- Secure environment
- Software includes MVS/SP, VM/SP, VM/XA, TSO, GDDM, CMS, and Presentation Graphics Equipment
- Processing done on IBM 3084 MX3 and IBM 4381 systems
- Accessible via many telecommunications methods
- Volume discounts

For more information write:
Jeff Daum
Manufacturers Hanover Data Services Corporation
P.O. Box 26
Carlstadt, New Jersey 07072

Or call (201) 896-2030

MANUFACTURERS HANOVER
IBM is a trademark of International Business Machines Corporation.
© 1987 Manufacturers Hanover Trust

Programmer Tools

FREE BUYER'S GUIDE

When you need programmer's development tools, Programmer's Connection is your best one-stop source. We are an independent dealer representing more than 200 manufacturers with over 600 software products for IBM personal computers and compatibles including: COBOL compilers and utilities, relational databases, and much more. Call today to receive a FREE comprehensive Buyer's Guide, and find out why Programmer's Connection is your best connection for software tools.

Programmer's Connection
7249 Whipple Ave NW
North Canton, Ohio 44720

800-336-1166 US
800-225-1166 Canada
216-494-3781 AK & OH (Collect)
216-494-5260 FAX
9102406879 Telex
216-494-3781 International

DATA ENTRY has changed . . .

From keypunches to 3741s to FourPhase, CADE, and Nixdorf . . . Now even the most complex data entry is quickly moving to PCs

Whether on a stand-alone PC, or on dozens in a LAN, KeyEntry III is a software package that provides a comprehensive professional-grade data entry system. Its ease of use, productivity, and unmatched range of capabilities have made it the most widely used PC-based system in the world.

Isn't it time to bring your data entry up-to-date?

KeyEntry III
Complete Evaluation Package
just $42.50, delivered.
1-800-533-6879
or (205) 251-2985. SCS, Inc., 2732 Seventh Avenue South, Birmingham, AL 35233

DATA ENTRY

CONVERSION SPECIALISTS
AUTOMATED CONVERSIONS TAILORED TO YOUR NEEDS
DOS TO MVS
HONEYWELL TO IBM DOS OR MVS
RPG TO COBOL
PL1 TO COBOL
MACRO TO COMMAND CICS
OTHER LANGUAGE SOFTWARE CONVERSIONS
CUSTOM PROGRAMMING
COBOL DOS
RPG II MVS
CICS CMS
BELCASTRO COMPUTER SERVICES
120 MILLCREEK RD
NILES, OH 44446
(800) 521-2861

COMPUTING SERVICES
MVS/XA VM/370 DOS/VSE
CICS TSO CMS
DB2 IMS/DBDC 4GL SAS
MULTIPLE CPUs - 50+ MIPS
TELENET, TYMNET
IBM INFORMATION NETWORK
DEDICATED SYSTEMS AVAILABLE
GIS
INFORMATION SYSTEMS, INC.
815 COMMERCE DRIVE
OAK BROOK, IL 60521
312-574-3636

Hardware

WANTED TO PURCHASE IBM 4381-P2/6 CHANNELS

Looking for June/July time frame.

Please send responses including asking price and machine serial # to:

Westchester Computers
P.O. Box 538
Main Street Station
Yonkers, NY 10702

USED S/38 WANTED

Private company is interested in directly purchasing a used system 38 for its own use. Any available model considered. Pelse respond to:

Information Systems Department
PO Box 17866
Anaheim, CA 92817

No Brokers Please

CONVERSION ENGINE®

THE CONVERSION PROCESSOR THAT AUTOMATICALLY CONVERTS 95 TO 98% OF APPLICATION CODE TO A NEW LANGUAGE STRUCTURE, OR ENVIRONMENT.

- Migrate to new hardware/operating system
- Change data base managers
- Go to new on-line monitor
- Re-structure the code

A unique system, the Conversion Engine® can Re-Engineer current applications—Lifting out logic, data flows, procedures, screen and print formats, etc.—Generating the desired replacement code.

Call or write:
M.D. FRIEDMAN & Associates, Inc.
9241 LBJ Frwy., Dallas, TX 75243 (214)644-1379

DEC CONVERSIONS

VAX	RSX	RT	RSTS	IBM	PC
TAPE			DISK		
800			RL02		
1650			RX01		
6250			RX02		
CARTRIDGE			FLOPPIES		
TK50			360K		
TU58			1.2M		

MEDCOM Info Systems, Inc.
Ask For Bob (714)974-1564

VAX TIME
5¢ PER CPU SECOND OR $800 PER MONTH FIXED RATE
• MOST MAJOR LANGUAGES
• PROGRAMMING AVAILABLE
• NATIONWIDE ACCESS
medcom Information Systems, Inc.
Ask for Bob at (714) 974-1564

Call to place your ad today
(800) 343-6474
(617) 879-0700

MARKETPLACE is Here!
Reach Over 512,000 Computer Professionals!
Call for all the details
(617) 879-0700 ext. 758, 759, 784
(201) 967-1358

Every month more than 125,000 information systems professionals FOCUS on the issues that make a difference.

When information systems professionals want to know more about the most important and pivotal issues facing them in 1988, they choose *Computerworld Focus* for the most in-depth and complete coverage available.

Every month *Focus* goes beyond the headlines and examines one current topic with an eye for its effect on information systems today, tomorrow and beyond.

Topics like connectivity, operating systems and languages, productivity software, departmental computing, security and many more are studied and analyzed from a total systems perspective. Critical issues involving PCs, communications and software will be covered several times during 1988. All get precise, cover-to-cover treatment in *Computerworld Focus.*

And *Focus* gets cover-to-cover treatment from its readers. More than 125,000 *Computerworld* subscribers — serious information systems professionals — turn to *Focus* every month for the bigger picture of product and service information that affects their specification, purchase or implementation decisions.

Take a look at what *Focus* has planned for 1988.

Computerworld Focus 1988 Schedule

Issue Date	Closing Date	Topic	Show Distribution
Jan. 6*	Dec. 4	Communications/ Connectivity	Communication Networks
Feb. 3	Dec. 31	Software Operating Systems & Languages	Uniforum
Mar. 2*	Jan. 29	Departmental Computing	Interface/ WCC
Apr. 6	Mar. 4	Data Security	
May 4	Apr. 1	Communications/ Connectivity	Comdex Spring/ ICA
June 1*	Apr. 29	PC End User Productivity	PC Expo
July 6	June 3	Software	
Aug. 3	July 1	Departmental Computing	
Sept. 7	Aug. 5	Communications	TCA
Oct. 5	Sept. 2	Software Productivity	Info '88/ Dexpo West
Nov. 2	Sept. 30	PC/Connectivity	Comdex Fall
Dec. 7	Nov. 4	Departmental Computing	

*Starch Ad Study Issue

Computerworld Focus. For the more than 125,000 information systems professionals who need to know not just *what's* happening — but also *why* and *what it will mean.* For information on advertising, contact your local *Computerworld* sales representative.

COMPUTERWORLD FOCUS

An IDG Communications Publication

COMPUTERWORLD FOCUS

Micro strategies unfold

COMPUTERWORLD

SALES OFFICES

Publisher/Fritz Landmann

Vice President/Associate Publisher/Val Landi, **COMPUTERWORLD,** 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171, (617) 879-0700

BOSTON: Northern Regional Manager/David Peterson, **District Managers/**Bill Cadigan, Sherry Driscoll, **Account Manager/**John Watts, **Sales Assistant/**Alice Longley, **COMPUTERWORLD,** 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (617) 879-0700

CHICAGO: Eastern Regional Director/Bernie Hockswender, **Midwest Regional Manager/**Kevin McPherson, **District Manager/**Larry Craven, **Sales Assistants/**Kathy Sullivant, Karol Lange, **COMPUTERWORLD,** 10400 West Higgins Road, Suite 300, Rosemont, IL 60018, (312) 827-4433

NEW YORK: Eastern Regional Director/Bernie Hockswender, **District Managers/**Fred Lo Sapio, Frank Genovese, **Sales Assistants/**Mary Tagliareni, Sue Larson, **COMPUTERWORLD,** Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652 (201) 967-1350

LOS ANGELES: Western Regional Director/Mark V. Glasner, **District Managers/**Carolyn Knox, Gary Hooks, **Sales Assistant/**Bev Raus, **COMPUTERWORLD,** 18004 Sky Park Circle, Suite 255, Irvine, CA 92714 (714) 261-1230

SAN FRANCISCO: Western Regional Director/Mark V. Glasner, **Senior District Manager/**Ernie Chamberlain, **District Managers/**Jan Harper, Michela O'Conner, **Account Manager/**Alicia Saribalis, **Sales Assistants/**Christina Werfhorst, Robert Condensa, **COMPUTERWORLD,** 500 Airport Boulevard, Suite 400, Burlingame, CA 94010 (415) 347-0555

ATLANTA: Eastern Regional Director/Bernie Hockswender, **Southeastern Regional Manager/**Kevin C. Harold, **Sales Assistant/**Melissa Christie, **COMPUTERWORLD,** 1400 Lake Hearn Drive, Suite 330, Atlanta, GA 30319 (404) 394-0758

DALLAS: Eastern Regional Director/Bernie Hockswender, **Southeastern Regional Manager/**Kevin C. Harold, **COMPUTERWORLD,** 14651 Dallas Parkway, Suite 304, Dallas, TX 75240 (214) 233-0882

WASHINGTON, D.C.: Eastern Regional Director/Bernie Hockswender, **District Manager/**Paula Smith, **COMPUTERWORLD,** Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652 (201) 967-1350

PRODUCT CLASSIFIED ADVERTISING: Product Classified Advertising Director/Eastern Account Manager/Debbie Eisenberg, Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652 (201) 967-1350

New England Account Manager/Paul Bonarrigo, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (617) 879-0700

Midwest Account Manager/Mary Campo, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (617) 879-0700

Western Account Manager/Karen Massimino, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (617) 879-0700

RECRUITMENT ADVERTISING: National Recruitment Sales Director/John Corrigan, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (617) 879-0700

RECRUITMENT ADVERTISING SALES OFFICES:
New England Recruitment Manager/Al DeMille, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (617) 879-0700

Mid-Atlantic Recruitment Manager/Warren Kolber, Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652 (201) 967-1350

Midwest Recruitment Manager/Patricia Powers, O'Hare Corporate Tower One, 10400 West Higgins Road, Suite 300, Rosemont, IL 60018 (312) 827-4433

Western Recruitment Manager/Barbara Murphy, 18004 Skypark Circle, Suite 100, Irvine, CA 92714 (714) 250-0164

South-Atlantic Recruitment Manager/Kathryn Kress, 3022 Javier Road, Suite 210, Fairfax, VA 22031 (703) 573-4115

Recruitment Telemarketing Account Executives: New England/Nancy Percival, **New York/**Jay Novack, **Mid-Atlantic/**Pauline Smith, **Midwest/**Ellen Casey, **Western/**Chris Glenn, 1-800-343-6474 or (617) 879-0700

IDG INTERNATIONAL MARKETING SERVICES:
Managing Director/Frank Cutitta, **COMPUTERWORLD,** 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (617) 879-0700

West Coast Marketing Manager/Leslie Barner, 3350 West Bayshore Road, Suite 201, Palo Alto, CA 94303 (415) 424-1001

CW PUBLISHING/INC.

An IDG Communications Company

Fritz Landmann/President

Computerworld Headquarters: 375 Cochituate Road, P.O. Box 9171, Framingham, MA 01701-9171
Phone: 617-879-0700, Telex: 95-1153, FAX: 617-875-8931

Vice President/Associate Publisher, Val Landi

OPERATIONS Vice President/Operations, Matthew Smith. **Business Manager,** Mark Sullivan.
SALES Advertising Director, Carolyn Novack. **National Recruitment Sales Director,** John Corrigan.
Display Advertising Production Manager, Maureen Carter. **Product Classified Operations Director,** Anne E. Hadley.
Classified Operations Manager, Cynthia Delany.

MARKETING Vice President Marketing & Circulation, Jack Edmonston. **Marketing Communications Director,** Jan Bell.
Marketing Services Director, Audrey Shohan. **Manager/Marketing Communications,** Mary Doyle.

CIRCULATION Vice President Marketing & Circulation, Jack Edmonston.
Director of Circulation Management, Maureen Burke. **Director of Circulation Promotion,** Jane Eyler.

PRODUCTION Production Director, Leigh Horneth. **Assistant Production Director,** Carol Polack.
Production Manager, Beverly Wolff. **Art Director,** Tom Monahan.

FOREIGN EDITORIAL/SALES OFFICES

Argentina: Ruben Argento, CW Communicaciones S/A, Av. Belgrano 406-Piso 9, CP 1092 Buenos Aires. Phone: (011) 54 134-5583. Telex: (390) 22644 (BAZAN AR).

Asia: S.W. Chan, Asia Computerworld Communications Ltd., 701-4 Kam Chung Bldg., 54 Jaffe Road, Wanchai, Hong Kong. Phone: (011) 852 5 861 3238. Telex: (780) 72827 (COMWOR HX).

Australia: Alan Power, IDG Communications Pty. Ltd., 37-43 Alexander Street, Crows Nest, NSW 2065. Phone: (011) 61 2 4395133. Telex: (790) AA74754 (COMMED).

Austria: Manfred Weiss, CW Publikationen Verlagsgesellschaft m.b.H., Ziegergasse 6, A-1070 Wien, Austria. Phone: (011) 43-222-930500. Telex: (847) 115 542 (SCH/A).

Brazil: Ney Kruel, Computerworld do Brazil, Rua Alcindo Guanabara, 25-11 andar, 20.031 Rio de Janeiro, RJ Brazil. Phone: (011) 55 21 240 8225. Telex: (391) 21 30838.

Denmark: Preben Engell, Computerworld Denmark A/S, Torvegade 52, 1400 Copenhagen K, Denmark. Phone: (011) 45 1955 695. Telex: (855) 31566.

France: Francois Chaussonniere, Computerworld Communications S.A., 185 Avenue Charles De Gaulle, 92200 Neuilly Sur Seine, France. Phone: (011) 33 14 747 1272. Telex: (842) 613234 F.

Hungary: Dezso Futasz, Computerworld Informatika Co., Ltd. H-1536 Budapest, Pf. 386, Hungary. Phone: (011) 36 1 228 458. Telex: (861) 22 6307 (CWI H).

Italy: Jean-Louis Redon, Computer Publishing Group S.R.L., Via Vida 7, 20127 Milano, Italy. Phone: (011) 39-2-2613432. Telex: (843) 335318.

Japan: Dick Yamashita, Computerworld Japan, Akasaka Omotemachi Bldg., Minato-ku, Tokyo 107. Phone: (011) 81 3 551 3882. Telex: (781) 252-4217 (Computerworld Japan only).

M. Nakamura, IDG Communications, Japan, c/o Marcom International, Inc., Akasaka Center Building, 1-3-12 Motoakasaka, Minato-ku, Tokyo 107, Japan. Phone: (011) 81 3 403-8515. Telex: (781) J27941 (reps for all CW Publishing publications except Computerworld Japan).

Mexico: Henry Morales, Computerworld/Mexico S.A. de C.V., Oaxaca 21-2, Mexico City 7 D.F. Colonia Roma, 06700 Mexico. Phone: (905) 514-4218 or 6309. Telex: (383) 177 1300 (ACHAME).

The Netherlands: Wout Berends, CW Communications B.V., van Eeghenstraat 84, 1071 GK Amsterdam, The Netherlands. Phone: (011) 31 20 646426. Telex: (844) 18242 (CWCOM NL).

New Zealand: Martin Taylor, Computerworld Communications Ltd., 2nd Floor, 15 Augustus Terrace, Parnell, Auckland, New Zealand. Phone: (011) 64-9-779-902. Fax: (011) 64 9 780 244.

Norway: Morten Hansen, CW Norge A/S, Hovinveien 43, 0576, Oslo 5, Norway. Phone: (011) 472 647725. Telex: (856) 76476 (CW NOR N).

People's Republic of China: Chen Mingkun, China Computerworld, 74 Lu Gu Road, Box 750, Beijing 100039, People's Republic of China. Phone: (011) 47 814 6174. Telex: (716) 222214 (CCW CN).

Spain: Francisco Zabala, CW Communications, S.A., Rafael Calvo, 18, 4B, 28010 Madrid, Spain. Phone: (011) 34 1 419 4014. Telex: (831) 45522 (CW E).

Sweden: Bengt Mannfeldt, CW Communications AB, Sodra Hamnvagen 22, S-115 41 Stockholm, Sweden. Phone: (011) 46 8 67 91 80. Telex: (854) 14904 9 (NOVACW).

Switzerland: Gebhard Osterwalder, CW Publikationen AG, Witikonerstrasse no. 15, Postfach 253, CH - 8030 Zurich, Switzerland. Phone: (011) 41 1 55 10 77. Telex: (845) 816 710 (CWCI CH).

Taiwan: Leona Wang, ACE Media Agency Co. Ltd., P.O. Box 26-578 Taipei, Taiwan, R.O.C. Phone: (011) 02 751 3636. Telex: (785) 14142 (ACE GROUP). (Representative for all CWCI publications).

London: Martin Durham, CW Communications Ltd., 99 Grays Inn Rd., London, WCI 8UT, United Kingdom. Phone: (011) 44 1 831 9252. Telex: (851) 262346 (THEPUB G).

United Kingdom: Euan Rose, Beere Hobson & Associates, 34 Warwick Road, Kenilworth, Warwickshire, CV8 1HE, United Kingdom. Phone: (011) 09 26 512424. Telex: (851) 311951 (BEEHOB). (Representative for all CWCI publications).

Venezuela: Kalman von Vajna Nagy, CW Comunicaciones, C.R.L. Torre Maracaibo, Piso 13, Oficina H, Av. Libertador, Caracas, Venezuela. Phone: (011) 58 2 72 76 30.

West Germany: Eckhard Utpadel, CW Publikationen Verlagsgesellschaft mbH, Rheinstrasse 26/28, Postfach 40 0429, 8000 Munchen 40, West Germany. Phone: (011) 49 89 360860. Telex: (841) 5215350. (COMW D).

IDG COMMUNICATIONS/INC.

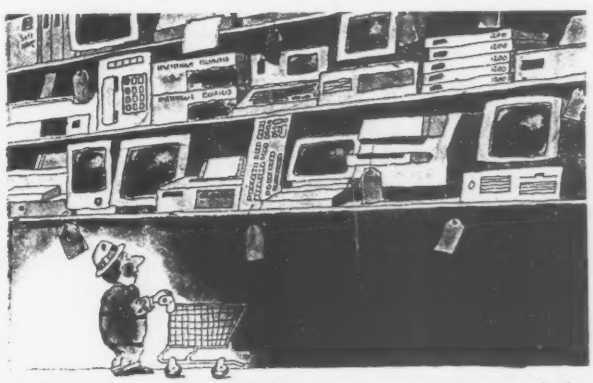
Patrick J. McGovern	Axel Leblois	William P. Murphy
Board Chairman	Chief Executive Officer	Vice President/Finance

Computerworld is a publication of IDG Communications, the world's largest publisher of computer-related information. IDG Communications publishes over 90 computer publications in 33 countries. Fourteen million people read one or more IDG Communications publications each month. IDG Communications publications contribute to the IDG News Service offering the latest on domestic and international computer news. IDG Communications publications include: ARGENTINA'S *Computerworld Argentina;* ASIA'S *Communications World, Computerworld Hong Kong, Computerworld Southeast Asia, PC Review;* AUSTRALIA'S *Computerworld Australia, Communications World, Australian PC World, Australian Macworld;* AUSTRIA'S *Computerwelt Oesterreich;* BRAZIL'S *DataNews, PC Mundo, Micro Mundo;* CANADA'S *Computer Data;* CHILE'S *Informatica, Computacion Personal;* DENMARK'S *Computerworld Denmark, PC World Danmark, CAD/CAM World;* FINLAND'S *Mikro, Tietovilkko;* FRANCE'S *Le Monde Informatique, Distributique, InfoPC, Telecoms International;* GREECE'S *Computer Age;* HUNGARY'S *Computerworld SZT, PC Mikrovilag;* INDIA'S *Dataquest, PC World India;* ISRAEL'S *People & Computers Monthly, People & Computers Weekly, SBM Monthly;* ITALY'S *Computerworld Italia;* JAPAN'S *Computerworld Japan, Semicon News;* MEXICO'S *Computerworld Mexico, PC Journal;* THE NETHERLANDS' *Computerworld Netherlands, PC World Benelux;* NEW ZEALAND'S *Computerworld New Zealand, Computerworld Norge, PC World Norge;* PEOPLE'S REPUBLIC OF CHINA'S *China Computerworld, China Computerworld Monthly;* SAUDI ARABIA'S *Arabian Computer News;* SOUTH KOREA'S *Computerworld Korea, PC World Korea;* SPAIN'S *Cimworld, Computerworld Espana, Commodore World, PC World Espana, Comunicaciones World;* SWEDEN'S *Computer Sweden, MikroDatorn, Svenska PC World;* SWITZERLAND'S Computerworld Schweiz; UNITED KINGDOM'S *Computer News, ICL Today, Lotus, PC Business World;* UNITED STATES' *Amiga World, CD-ROM Review, CIO, Computer Currents, Computerworld, Digital News, Federal Computer Week, 80 Micro, Focus Publications, InCider, InfoWorld, Macintosh Today, Macworld, Computer + Software News (Micro Marketworld/Lebhar-Friedman), Network World, PC Letter, PC World, Portable Computer Review, Publish!, PC Resource, Run;* VENEZUELA'S *Computerworld Venezuela;* WEST GERMANY'S *Computerwoche, Information Management, PC Welt, PCWoche, Run/Run Specials.*

ADVERTISERS INDEX

Advanced Computer Communications	10
A.I. Corp.	22
Ameritech	44-45
Application Development Systems	66
AT&T	57
Beta Systems Software, Inc.	23
B.I. Moyle & Associates	56
BMC Software	26,27
Businessland	52
CGI Systems	48-49
Chicago Soft	37
Compaq Computer	30-31
Computer Associates	36-37
Computer Corp. of America	50-51
Computer Task Group/Dataware	64
Control Data	24
Cullinet	5
CW Button	43
CW Circulation	60
CW Focus	92
CW Marketplace	55,64,68
CW Spotlight	73
Data General	32
Data Group	72
DB2 Performance	17
Exide Electronics	46
IBM	38
IIS, Inc.	47
IIS Technology	34
Information Builders	28
Intel Corporation	C3
Kolinar Corporation	41
Macintosh Today	67
Micro Focus	29
MMA Consulting	49
Motorola	20-21
MSA	C4
Multi-Tech Systems	39
Nixdorf Computer	62-63
Nynex	15
Onan	42
Oracle	9,11
Radio Shack	16
Realia	14
SAS Institute	12-13
Syncsort	3
Tandem Computer	40-41
Televideo	42/43
Tymnet	70-71
Unisys	58-59
Unitech	65
VM Software	7
Winterhalter	56

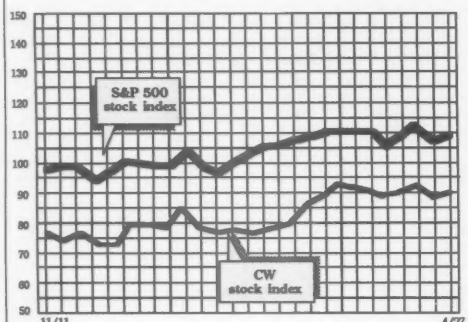
This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.



Upcoming Computerworld Spotlight Sections

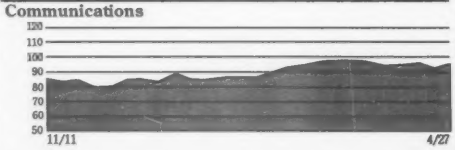
Issue Date	Topic	Ad Closing Date
May 23	Data Communications	May 6
June 6	CASE	May 20
June 20	The SNA Market	June 3
July 11	Disaster Prevention & Recovery Products & Services	June 24
July 25	Productivity Software	July 8
Aug. 8	TBA	July 22
Aug. 29	DB2 Market	Aug. 12
Sept. 19	Hardware Roundup: Large, Medium Scale and Special Purpose Systems	Sept. 2
Sept. 26	Hardware Roundup: Small Scale Systems	Sept. 9
Oct. 3	Hardware Roundup: Personal Computers and Workstations	Sept. 16
Oct. 17	AI/Expert Systems	Sept. 30
Oct. 31	Unix	Oct. 14

STOCK TRADING INDEX



Indexes	Last Week	This Week
Communications	92.7	96.8
Computer Systems	99.3	103.0
Software & DP Services	98.3	99.6
Semiconductors	65.7	68.3
Peripherals & Subsystems	89.7	90.7
Leasing Companies	116.9	115.8
Composite Index	89.2	91.2
S&P 500 Index	107.0	110.2

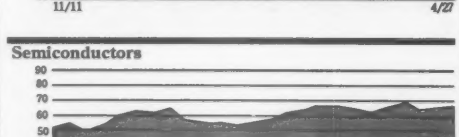
Communications



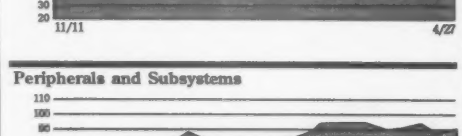
Computer Systems

Software and DP Services

Semiconductors



Peripherals and Subsystems



Leasing Companies

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, APRIL 27, 1988

EXCH		52-WEEK RANGE (1)		PRICE CLOSE APRIL 27 1988	WEEK NET CHNGE	WEEK PCT CHNGE

Communications and Network Services

N	AMERICAN INFO TECHS CORP	100	74	89.50	4.4	5.1
Q	ANDREW CORP	18	11	14.38	1.1	8.5
Q	ARTEL COMM CORP	3	2	1.88	-0.3	-11.8
N	AT&T	36	20	26.63	0.1	0.5
Q	AVANT GARDE COMP INC	6	2	2.00	0.5	33.3
Q	AVANTEK INC	17	6	7.00	0.4	5.7
N	AYDIN CORP	35	16	21.38	-1.0	-4.5
N	BELL ATLANTIC CORP	80	61	67.13	2.5	3.9
N	BELLSOUTH CORP	44	29	39.50	1.6	4.3
Q	COMPRESSION LABS INC	6	2	3.13	0.0	0.0
O	COMPUTER NETWORK TECH	6	1	1.28	0.0	0.0
O	CONTEL CORP	40	25	33.38	-0.1	-0.4
Q	DATA SWITCH CORP	10	4	7.88	0.0	0.0
Q	DIGITAL COMM ASSOC	49	20	32.88	2.0	6.5
Q	DYNATECH CORP	33	14	22.75	-0.3	-1.1
Q	FIBRONICS INTERNATIONAL INC	8	2	4.38	0.5	12.9
Q	GANDALF TECHNOLOGIES	10	5	7.25	-0.1	-1.7
Q	GENERAL DATACOMM INDS	14	3	4.00	0.4	10.3
N	GTE CORP	45	29	36.88	1.0	2.9
Q	INFOTRON SYS CORP	12	5	11.25	1.8	18.4
N	ITT CORP	66	42	46.63	1.3	2.8
N	M A COM INC	16	7	10.13	0.4	3.8
Q	MCI COMMUNICATIONS CORP	14	6	13.63	0.6	4.8
Q	MICOM SYS INC	17	7	16.75	3.3	24.1
Q	NETWORK SYS CORP	13	7	9.88	1.0	11.3
N	NORTHERN TELECOM LTD	24	14	17.88	-0.1	-0.7
Q	NOVELL INC	30	12	19.75	0.0	0.0
N	NYNEX CORP	78	58	64.50	2.1	3.4
N	PACIFIC TELESIS GROUP	34	23	28.88	1.5	5.5
Q	PARADYNE CORP	9	4	4.50	-0.1	-2.7
A	PENRIL CORP	5	1	4.75	0.6	15.2
N	PLESSEY PLC	40	23	29.75	-0.3	-0.8
N	SCIENTIFIC ATLANTA INC	20	8	14.63	-0.4	-2.5
N	SOUTHWESTERN BELL CORP	46	32	35.75	0.9	2.5
Q	3 COM CORP	26	12	19.63	1.0	5.4
N	TIMEPLEX INC	40	17	32.30	0.0	0.0
Q	UNGERMANN BASS INC	16	5	12.00	0.0	0.0
N	U S WEST INC	60	43	53.38	2.4	4.7

Computer Systems

Q	ALLIANT COMPUTER SYS	36	5	7.00	-0.5	-6.7
Q	ALPHA MICROSYSTEMS	6	3	5.75	0.5	9.5
Q	ALTOS COMPUTER SYS	15	9	9.50	0.1	1.3
A	AMDAHL CORP	50	19	39.75	3.4	9.3
Q	APOLLO COMPUTER INC	25	9	15.00	0.6	4.3
Q	APPLE COMPUTER INC	60	28	41.75	2.0	5.0
N	BOLT BERANEK & NEWMAN	25	12	17.50	-1.1	-6.0
Q	BRITTON LEE INC	5	1	2.13	0.3	13.3
N	COMPAQ COMPUTER CORP	79	34	52.88	1.6	3.2
Q	COMPUTER AUTOMATION INC	17	6	10.75	-1.1	-9.5
A	COMPUTER CONSOLES INC	11	2	7.00	-0.4	-5.1
Q	CONCURRENT COMP CORP	24	11	17.00	-0.5	-2.9
N	CONTROL DATA CORP DEL	38	18	24.75	1.0	4.2
Q	CONVERGENT TECH	9	3	3.19	0.0	0.0
Q	CONVEX COMPUTER CORP	20	6	8.50	1.3	17.2
N	CRAY RESH INC	125	47	86.50	7.1	9.0
Q	DAISY SYS CORP	10	5	9.25	1.1	13.8
N	DATA GEN CORP	37	16	23.25	0.0	0.0
N	DATAPOINT CORP	9	3	5.38	0.1	2.4
N	DIGITAL EQUIP CORP	200	99	106.75	5.8	5.7
N	FLOATING POINT SYS INC	13	3	4.13	-0.1	-2.9
N	GOULD INC	34	8	11.13	0.1	1.1
N	HARRIS CORP	43	22	30.00	0.4	1.3
N	HEWLETT PACKARD CO	74	36	62.63	1.0	1.6
N	HONEYWELL INC	91	49	70.88	1.9	2.7
N	IBM	176	102	114.00	1.1	1.0
Q	INFORMATION INTL INC	15	9	12.63	-0.1	-1.0
Q	IPL SYS INC	3	1	2.00	0.4	23.1
Q	MASS COMPUTER CORP	14	4	5.00	0.4	9.8
N	MATSUSHITA ELEC INDL LTD	228	103	221.00	-0.8	-0.3
Q	MEGADATA CORP	6	3	3.13	0.1	4.2
Q	MENTOR GRAPHICS CORP	39	14	30.75	2.6	9.3
N	NBI INC	14	4	5.13	-0.3	-4.7
N	NCR CORP	87	50	62.38	3.6	6.2
N	PRIME COMPUTER INC	31	12	17.38	0.8	4.5
Q	PYRAMID TECHNOLOGY	14	5	13.25	1.3	10.4
Q	STRATUS COMPUTER	41	15	28.00	3.0	12.0
Q	SUN MICROSYSTEM INC	46	14	36.25	-0.9	-2.4
Q	SYMBOLICS INC	5	1	1.75	0.0	0.0
N	TANDEM COMPUTERS INC	37	16	18.88	2.1	12.7
N	TANDY CORP	57	28	45.75	2.6	6.1
N	ULTIMATE CORP	37	12	12.88	-0.6	-4.6
N	UNISYS CORP	48	24	34.50	2.1	6.6
A	WANG LABS INC	19	10	11.38	-0.1	-1.1

Software & DP Services

Q	ADVANCED COMP TECH	6	1	1.50	0.0	0.0
N	AGS COMPUTERS INC	30	11	17.00	-0.4	-2.2
Q	AMERICAN MGMT SYS INC	20	9	15.75	0.4	2.4
Q	AMERICAN SOFTWARE INC	20	6	13.38	0.4	2.9
N	ANACOMP INC	11	4	9.63	0.1	1.3
Q	ANALYSTS INTL CORP	10	4	8.00	0.8	10.3
Q	ASHTON TATE	33	13	27.75	0.5	1.8
Q	ASK COMPUTER SYS INC	16	6	14.00	0.3	1.8
Q	AUTODESK INC	34	12	29.25	3.5	13.6
N	AUTO DATA PROCESSING	55	16	40.88	0.0	0.0
Q	BOOLE & BABBAGE INC	12	5	7.75	0.0	0.0
N	COMPUTER ASSOC INTL INC	37	15	27.13	0.4	1.4
Q	COMPUTER HORIZONS CORP	15	7	10.88	-0.3	-2.2
N	COMPUTER SCIENCES CORP	73	42	43.75	1.3	2.9
N	COMPUTER TASK GROUP INC	17	9	11.50	0.0	0.0
Q	COGNOS INC.	17	4	7.13	0.0	0.0
Q	COMSHARE INC	28	12	16.75	-0.8	-4.3
Q	CULLINET SOFTWARE INC	14	4	7.88	0.9	12.5
Q	DUQUESNE SYS INC	30	10	20.00	0.5	2.8
A	DATA ARCHITECTS INC	16	7	13.75	0.0	0.0
N	GENERAL MTRS (CLS E)	51	30	43.00	1.8	4.2
Q	HOGAN SYS INC	17	4	4.25	0.0	0.0
Q	INFORMIX CORP	31	12	21.00	1.4	7.0
Q	INTELLICORP INC	11	2	3.00	0.0	0.0
Q	KEANE INC	11	6	10.50	1.0	10.5
Q	LOTUS DEV CORP	40	19	22.75	-0.3	-1.1
Q	MANAGEMENT SCI AMER	15	6	8.13	0.8	10.2
Q	MICRO PRO INTL CORP	8	3	2.88	0.3	9.5
Q	MICROSOFT CORP	79	37	55.50	1.0	1.8
Q	MORINO ASSOCIATES INC	24	7	16	0.4	2.4
Q	NATIONAL DATA CORP	34	19	28.13	-0.8	-2.6
Q	ON LINE SOFTWARE INTL INC	22	9	9.88	0.0	0.0
Q	ORACLE SYS CORP	19	8	15.75	0.3	1.6
N	PANSOPHIC SYS INC	28	11	16.50	-0.4	-2.2
Q	POLICY MGMT SYS CORP	30	15	24.13	0.9	3.8
Q	PROGRAMMING & SYS INC	14	7	12.25	0.3	2.1
Q	REYNOLDS & REYNOLDS CO	38	14	17.63	-2.8	-13.5
Q	SEI CORP	19	10	18.00	-0.3	-1.4
Q	SHARED MED SYS CORP	31	19	23.63	-0.1	-0.5
Q	SOFTWARE AG SYSTEMS INC	14	7	7.00	0.0	0.0
Q	SOFTWARE PUBG CORP	17	5	15.38	-0.9	-5.4
A	STERLING SOFTWARE INC	12	6	9.00	0.0	0.0
Q	SUNGARD DATA SYS INC	21	10	17.75	0.5	2.9
Q	SYSTEMATICS INC	32	19	30.75	0.0	0.0
N	SYS. SOFT INC.	24	7	15	-1.5	-9.4
Q	VM SOFTWARE INC	40	7	13.50	-0.3	-1.8

Semiconductors

N	ADV MICRO DEVICES INC	25	8	14.25	1.8	14.0
N	ANALOG DEVICES INC	24	8	14.00	0.9	6.7
Q	ANALOGIC CORP	13	5	7.25	-0.1	-1.7
Q	INTEL CORP	42	18	32.25	1.0	3.2
Q	LSI LOGIC CORP	17	7	9.88	0.1	1.3
N	MOTOROLA INC	74	35	49.13	2.5	5.4
N	NATL SEMICONDUCTOR	22	10	13.50	1.4	11.3
N	TEXAS INSTRS INC	80	36	48.50	-0.8	-1.5
A	WESTERN DIGITAL CORP	33	11	15.50	1.0	6.9

Peripherals

Q	ALLOY COMP.	13	3	4.13	0.4	10.0
N	AM INTL INC	9	3	3.63	-0.3	-6.5
Q	AST RESH INC	21	6	15.00	-0.9	-5.5
Q	AUTO TROL TECH CORP	9	3	4.75	0.1	2.7
Q	BANCTEC INC	16	5	8.25	0.0	0.0
Q	CIPHER DATA PRODS INC	14	4	9.25	-0.6	-6.3
A	COGNITRONICS CORP	5	2	3.88	0.6	19.2
N	COMPUGRAPHIC CORP	28	19	26.00	0.3	1.0
A	DATAPRODUCTS CORP	24	7	10.00	0.9	9.6
A	DATARAM CORP	8	5	7.75	-0.1	-1.6
N	DECISION INDS CORP	13	4	10.75	0.0	0.0
N	EASTMAN KODAK CO	71	39	41.00	1.0	2.5
Q	E M C CORP MASS	29	7	7.50	-6.3	-45.5
Q	EMULEX CORP	9	4	8.00	-0.1	-1.5
Q	EVANS & SUTHERLAND	35	17	17.75	-0.6	-3.4
Q	ICOT CORP	8	3	3.31	-0.2	-5.3
Q	INTERLEAF INC	24	11	17.38	-0.9	-4.8
Q	IOMEGA CORP	5	1	3.38	-0.2	-5.3
Q	LEE DATA CORP	8	3	3.75	0.1	3.4
Q	MASSTOR SYS CORP	6	1	3.13	0.3	8.7
Q	MAXTOR CORP	33	6	15.50	0.9	6.0
Q	MICROPOLIS CORP	44	13	25.00	1.3	5.3
Q	MINISCRIBE CORP	18	5	12.00	0.5	4.3
N	MINNESOTA MNG & MFG CO	84	45	60.13	1.3	2.1
A	MSI DATA CORP	19	8	16.25	-0.3	-1.5
Q	PERSONAL COMPUTER PRODUCTS INC.	7	4	6.13	0.0	0.0
Q	PRIAM CORP	6	1	2.13	0.1	6.3
Q	PRINTRONIX INC	13	7	8.63	-0.3	-2.8
N	QMS INC	27	8	11.00	0.9	8.6
Q	QUANTUM CORP	26	8	11.00	0.0	0.0
Q	RAMTEK CORP	6	1	1.25	0.0	0.0
N	RECOGNITION EQUIP INC	22	7	9.13	0.4	4.3
Q	REXON INC	14	5	8.50	0.4	4.6
Q	SCAN TRON CORP	17	7	16.38	0.0	0.0
Q	SEAGATE TECHNOLOGY	46	10	20.50	2.1	11.8
N	STORAGE TECH CORP	5	1	1.75	0.1	7.7
Q	TANDON CORP	7	1	2.63	0.4	16.7
A	TEC INC	7	3	4.75	0.0	0.0
N	TEKTRONIX INC	41	21	24.63	-0.5	-2.0
Q	TELEVIDEO SYS INC	3	1	1.31	0.1	5.0
N	TELEX CORP	83	30	48.25	-0.4	-0.8
Q	WYSE TECH	40	11	20.00	0.9	4.6
N	XEROX CORP	85	50	54.13	1.0	1.9
Q	XIDEX CORP	16	6	6.25	0.1	2.0

Leasing Companies

Q	CAPITAL ASSOCIATES INTER-NATIONAL INC	11	4	4.50	-0.4	-7.7
N	COMDISCO INC	37	12	21.38	0.1	0.6
N	CONTINENTAL INFO SYS	14	5	7.63	-0.1	-1.6
Q	PHOENIX AMERN INC	6	2	3.00	0.1	4.3
Q	SELECTERM INC	6	3	4.25	0.0	0.0

EXCH: N = NEW YORK; A = AMERICAN; Q = NATIONAL; O = OVER-THE-COUNTER; S = SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Get set, go!

DEC out in front as high-tech stocks take market lead

Computer stocks were up and running last week, outpacing a steadily favorable market that ended curiously Thursday with the slowest trading session this year. Digital Equipment Corp. posted the most significant gain of the week among leading issues. DEC's stock caught fire following news that the firm will market software on a laser disk, ending the four days of trading up 6¾ points to 106.

Healthy gains were also posted by Micom Systems, Inc., up 3¾ points to 17 following news that it has received takeover offers it plans to pursue (see story page 69), and MAI Basic Four, Inc., which gained 3½ points to 18½ following an announcement that two principal shareholders will sell their shares.

Other top gainers for the week included Stratus Computer, Inc., up 2¾ points to 27¾; Cray Research, Inc., up 2½ points to 84⅜; Tandem Computers, Inc., up 2⅛ points to 18¾; and Amdahl Corp., up 2 points to 39¾. The few losers on the Street included Computer Associates International, Inc., down 1½ points to 25¾; Sun Microsystems, Inc., off 1 point to 35¾; and IBM, down ⅝ of a point to 113⅛.

JAMES DALY

Compatibility

FROM PAGE 1

and marry. For couples in MIS, job stress, erratic travel schedules and management frustrations are all just a part of daily living.

"There are more of us than you think," stresses one systems analyst at AT&T. "Really, there are."

At one time, the Chevron Information Services Group was getting so large, former MIS director Charles Oldenburg recalls, that top management was worried about what to do with the proliferation of romances that were springing up in the department.

"We never allowed one person to work for his or her spouse," he says. "These relationships made our decisions to transfer one person to another state very complex."

Carl and Janice Coulter

Aside from user companies, MIS marriages can also be found in professional MIS groups such as the Data Processing Managers Association (DPMA).

"If I were to call up all of our chapters, I bet I could find at least six couples in each one, and then they would know of others," says John Venator, DPMA executive director.

Keeping it at the office

Couples in the field admit they have to shake off some stereotypes. To outsiders, "MIS romance" evokes visions of two extremely unemotional beings who come home only to log on to the computer in the den. Conversations in the household would focus on the merits of VTAM and VMS.

When people find out that Hammitt and Pisani are both in MIS, "they must think our lives must be boring," Hammitt says. "But we rarely talk about technology at home. And we don't have a computer."

In fact, couples interviewed find it a relief that their spouses can understand what they do.

"My first husband just couldn't relate to my problems," one MIS director confides. "My second is in MIS, and we get along just fine."

When husbands or wives are familiar with the intimate details of a job, they find it easier to comfort the other person.

Larry and Dorothy Deran both work in Palo Alto, Calif., as MIS directors. Larry heads the operations at office supplier Tab Products Co., and his wife works as the director of resource information systems at Syntex Laboratories, Inc.

"You tend to be more sympathetic about each other's pressures," Dorothy notes.

Others agree. "You know, there are some jobs that are just not universally understood," says Janice Coulter, information management specialist for AT&T's MIS operations. "Being in MIS is both technical and, therefore, somewhat confusing for people."

Janice often shares ideas with her husband, Carl, a systems analyst at McGraw-Hill, Inc.

In his job, he helps the company select and maintain IBM mainframe-based financial software.

"This is my first time in a large MIS shop," she says. "Being at McGraw-Hill, he's used to it. So Carl is helping me understand how to move around in a huge shop."

Not always rosy

While a natural compatibility exists, there is plenty of room for tension. Years ago, Bev Madron taught MIS at Western Kentucky University, and her husband, Tom, worked there as the director of academic computing.

"She looked at how technology should be implemented from a philosophical viewpoint, while I looked at technology from a practical one because I had control over operations," he recalls. "Yes, we've had some pretty strong arguments over technology issues and issues relating to the direction of the industry."

Carole and David Benbassat

And now their roles have changed. She is the associate director of information services at the Newark, N.J., campus of Rutgers University. He is president of the New Jersey Educational Computing Network, Inc., a company that provides computer and consulting services to schools.

Experience has taught them to share technical expertise only when asked. "We tend not to get overbearing," Tom says. "One is very cautious about offering gratuitous advice to the other."

Staying independent

For many couples, the question of whether either would like to work for the other spouse sets heads shaking.

"No," Pisani says flatly. "We respect each other professionally, but I would not want to work for John. I'd be willing to work on a project for a little while with him, but not for him."

Her husband immediately concurs. Their management styles are different, he explains. "I focus on the long term, how Pillsbury can influence the rest of the industry, how we are to stay competitive," Hammitt says. "She looks at the present, what must be done now to make things happen. She sets high standards, but I'm more comfortable with flexibility. I doubt we would ever be able to work together."

With first-hand knowledge of what MIS management entails, one spouse can share the joy when the other has successfully implemented a new IBM 9370 or when he or she receives a congratulatory letter for building a strong MIS department. They can respect each other as professionals and help solve technical and managerial problems without a spirit of competition.

On the road again

Yet, with long hours coupled with rigorous travel schedules, the stresses of MIS can be overwhelming. Last year, Hammitt and his wife traveled so much for their jobs that they often arranged to meet each other in midpoint cities on the weekends.

Joanne Pisani and John Hammitt

Nancy Bradley, former president of her local DPMA chapter, and her husband, Gary, can attest to radical work schedules. Nancy trains data processing teachers in Las Vegas. Gary works in Denver at Covia, Inc., the United Airlines technology subsidiary, as a systems programmer analyst. They are rapidly racking up frequent-flyer miles as they fly to meet each other every week.

"I rather enjoy this schedule," Nancy says. "A lot of people in this field don't get to see a lot of each other on the weeknights anyway. We've been married 29 years, and now every weekend is like a honeymoon."

For some, being married to an MIS spouse can be socially limiting. Meeting each other's work friends also means meeting another colleague in the business.

"We find that we tend to meet fewer people in other fields," notes David Benbassat, an MIS consultant whose wife, Carole, trains other MIS managers. "Most of our friends are in the computer field in one way or another."

Many of the couples say they probably talk more about work at home than they should. They must make a conscious effort to draw the line between business and pleasure. But, for some, technology is a hobby. "Yes," Bev Madron admits. "We do talk about VAXs and IBMs at home."

Having similar jobs does not strike these couples as strange or even as an issue that comes up very often. For Hammitt and Pisani, their other shared interests — exercise, cultural activities, cooking and travel — make for balanced and well-rounded lives.

"We don't consider ourselves technologists," Hammitt stresses. "We are business people in the business of managing technology. We would have a lot in common with executives in other industries."

For love's sake

When both husband and wife are highly successful, moving to another MIS position in another part of the country is commonplace. And, in many cases, both people's careers will not move in parallel when one relocates for the other. That means sacrifice.

Joanne Pisani was at the top of the MIS totem pole at Avon Products, Inc. in New York. But when she married Chicago-based John Hammitt, she made the decision to relocate and work at an Avon branch in an MIS capacity as a line manager. It was a move down, not up, the corporate ladder — not an easy transition.

"You have to understand the consequences of your actions before you do something like this, because a lot of resentment can build up afterward," she warns. "It was more important for me to live in the same house with my husband than to live apart and commute to see each other. It all boils down to your value system."

Pisani also emphasizes that her husband said he would be willing to move for her if she ever got an irresistible job offer out of state.

For couples who are wedded to their jobs, maintaining a marriage while living apart is an alternative.

"I never told him not to go," says Nancy Bradley, a data processing trainer in Las Vegas. "But I love my job." So when her husband, Gary, got a job as a programmer/analyst at Covia, Inc. in Denver, Nancy stayed put. She says she likes the lifestyle of Las Vegas and does not care much for Denver's cold winters.

So far, their marriage of 29 years has fared well, but it was rough at the start, she acknowledges. Before his job relocation, they had never been apart for more than three days at a time. She was not used to being alone at night or taking care of all the household responsibilities. On top of that, they must now pay to live in two places.

"We talk on the phone every day and see each other on weekends," she says. "Now that I have gotten used to it, I rather enjoy this schedule."

KATHY CHIN LEONG

No surprises expected this time around

BY ALAN J. RYAN
CW STAFF

ATLANTA — Dealers heading to the Peachtree State next week for Comdex/Spring '88 are expecting little in the way of product announcements and look forward to a relatively relaxed atmosphere.

When the spring version of The Interface Group's trade show opens its doors Monday, few hot announcements are anticipated.

Recent interesting rollouts, like the IBM Personal System/2 compatibles from Texas-based Tandy Corp. and Dell Computers/PCs Limited, will likely draw crowds, but it is unlikely that anything announced at the show itself will top them.

Dennis Scarfile, owner of Computerworks, Inc. in Annapolis, Md., said his store will not be represented at the show because he has not heard of any interesting products.

"When there is a giant step forward in the industry, like 386 machines or laser printers, we go," Scarfile said. "But a lot of the Comdex shows now are flat."

In search of a printer

Three members of the Upgrade for Computrements staff in North Olmsted, Ohio, will be attending the show, according to Upgrade owner Jim Madigan.

They will be looking for a second laser printer line to carry — the stores now have Hewlett-Packard Co. machines on their shelves — and a cost-effective laptop.

Mostly, though, Madigan conceded, the trip to Atlanta is an "R&R" perk for his workers. "They don't learn that much at the show. We just use it for the guys to get out, have fun and see a lot of products. It's hard to prove that it pays off," he added.

For Glenn Paul of Clancy-Paul & Associates in Cranbury, N.J., there are other reasons to attend. "I've long since stopped going to Comdex to look for products," he said. "I mostly go to meet people I don't get to see in the course of business and to think about my product strategy."

Hobnobbing

Paul said the show offers the ability "to focus on products for a week, rather than one product at a time as you do in the normal course of a day." He added that the show is a place for establishing and maintaining relationships with vendors.

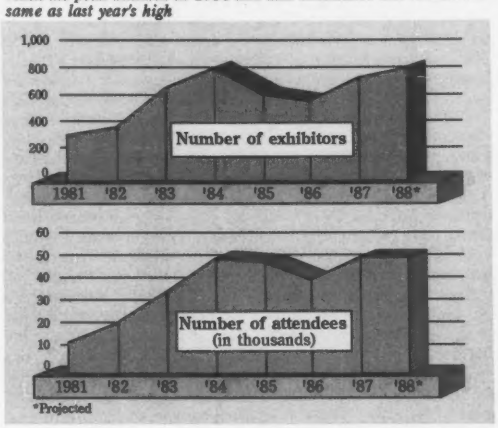
Paul said the size of the spring show, which is considerably smaller than its Las Vegas sister that takes place in the fall, creates an easier atmosphere in which to conduct business.

But to some Comdex diehards, the spring show isn't the real thing. "Las Vegas is where it's at," said Tom Jacobs, chairman of Computer Town in Nashua, N.H. "That's where it got started, and the better introductions are there."

Some 850 vendors are expected to fill 4,000 10-by-10-foot booth units, an Interface spokeswoman said. Attendance is projected at 52,000.

March on Atlanta

Comdex/Spring '88 organizers project the number of exhibitors will reach the peak attained in 1984 and that attendance will remain the same as last year's high



INFORMATION PROVIDED BY THE INTERFACE GROUP, INC.
CW CHART

The Tandy/Dell show

PS/2 at center stage; PC compatibles pull up rear

ATLANTA — IBM's Personal System/2 family and Micro Channel architecture-compatible systems from Tandy Corp. and Dell Computers/PCs Limited are expected to be drawing cards at Comdex/Spring '88 here next week. However, systems compatible with IBM's Personal Computer line are also among the rollouts expected at the show.

Some systems, cards and terminals users can expect to see next week include the following:

• San Jose, Calif.-based Chips and Technologies, Inc.'s 20-MHz New Enhanced AT, or Neat chip set. The company currently offers 16- and 12-MHz versions. The speedier version is shipping now and is included in the recently announced Zenith Data Systems Supersport 286 laptop and the 220 Delta from Dell. The chip sets run IBM's and Microsoft Corp.'s OS/2 and Microsoft's MS-DOS operating systems and application software.

• Acer Technologies Corp.'s venture into the lower end of the PS/2-compatible market. The Acer 1030 is said to be compatible with the PS/2 Model 30 and supports both 3½- and 5¼-in. floppy disk drives. It comes with 640K bytes of on-board random-access memory, four open eight-bit IBM PC XT-compatible expansion slots and multigraphics display capability. It will be priced at less than $1,400.

Acer will also announce the Acer 915, an IBM PC AT-compatible machine running at 12.5 MHz and selling for less than $2,300, and the Acerserver 5200, an Intel Corp. 80386-based server configured with Novell, Inc. Netware Version 2.11 software. The server will be available in either 70M- or 130M-byte hard-disk versions and will sell for less than $9,000.

• Vendex Technologies, Inc.'s line of Headstart computers. The Headstart II is a 9.54-MHz, 640K-byte PC XT compatible featuring one 5¼-in., 360K-byte floppy and one 3½-in., 1.44M-byte floppy disk drive. Its price is $1,195.

Headstart II Plus adds a 32M-byte hard disk drive, a 2,400 bit/sec. modem and a mouse to the Headstart II; it will sell for $2,195.

Also from Vendex, Headstart III is based on Intel's 80286 processor and features 1M-byte built-in RAM, expandable to 2M bytes. It will sell for $2,595. The company's 16-MHz 80286-based Headstart Pro features bundled OS/2. With the addition of two chips, it can be transformed to a 20-MHz 80386-based machine. It will sell for $3,995. All units are scheduled to begin shipping in August.

• Tandon Computer Corp.'s Tandon 286 is set to make its debut at Comdex. The computer offers a 12-MHz 80286 microprocessor, eight expansion slots, a fixed 60M- or 110M-byte Winchester disk drive and a 1.2M-byte floppy. The Tandon 286's Personal Data Pac allows the Winchester drive to be removed and ported. Pricing was not available at press time.

• Sunnyvale, Calif.-based Advanced Transducer Devices, Inc.'s 80386 accelerator board, the 386 ATD, which will reportedly allow users to turn any computer based on Intel's 80286 microprocessor into an 80386 machine. The board is compatible with OS/2, the company said. The system's price is $1,295, and an 80-pin connector lets the user add up to 4M bytes of expansion memory.

• The AOX PS/2 processor upgrade card from AOX, Inc. in Waltham, Mass. The card is designed to work with the PS/2 line to upgrade it to the 80386 microprocessor. The card for the 80286-based PS/2 models will be available in 16-, 20- and 25-MHz versions, providing two to four times the performance of the PS/2 Models 50 and 60. Prices have not been set.

• Norcross, Ga.-based Quadram Corp.'s JT Fax PS/Q, a PC facsimile board reportedly compatible with the PS/2 Micro Channel. The board is said to turn a PS/2 Model 50, 60 or 80 or fully Micro Channel-compatible computer into a Group III-compatible facsimile machine. It is scheduled to be available in the third quarter and will be priced at less than $600.

• Graphics terminals from C. Itoh Electronics, Inc. in Irvine, Calif. Digital Equipment Corp.-compatible graphics terminals, the CIT334 and CIT344, are monochrome and color graphics terminals compatible with DEC's VT330 and VT340. The units include emulation of DEC's Sessions Support Utility features, which allow two separate sessions from one VAX to communicate over one port.

Users' choice in networking

ATLANTA — Users at next week's Comdex/Spring '88 can expect to find communications products that run the gamut from modems and communications links to desktop messaging systems and 10M-bit Ethernet over twisted-pair wire.

Among the scheduled introductions are the following:

• Localnet Communications will announce its D-Link local-area network twisted-pair and Ethernet communications line. D-Link Ethernet, an adapter card for IBM Personal Computers, PC XTs, ATs, Personal System/2s and compatibles, will reportedly provide connection to an Ethernet IEEE 802.3 industry-standard, 10M bit/sec. baseband LAN. The product uses very large-scale integration technology and will provide 100% compatibility with the Novell, Inc. Ethernet card. D-Link Ethernet costs $369.

A D-Link Ethernet DE-001 card for IBM PC XTs and ATs will also be introduced. The card reportedly shows an I/O throughput of 248.45K bit/sec. and is also available in a configuration for the PS/2. Prices will be $369 for the DE-001 and $469 for the D-001/2.

• A PC-based desktop messaging product will be introduced by Hyundai Electronics America. The Super-16CS is based on Hyundai's Super-16T XT-Turbo and bundled with voice-messaging functions and an integrated software package, Office Works from Alpha Software. The software requires 192K bytes of random-access memory. The half-size system card will operate in the PC terminal diskless workstation called PC Terminal and the Hyundai Super-286C AT-compatible. Total system price, including software, is less than $1,400 for a dual-floppy system.

• White Crane Systems, Inc. is slated to release Version 2.0 of Brooklyn Bridge, a utility for moving data between IBM and compatible microcomputers. It offers a dual-directory display file manager and includes four DOS utilities, as well as device drivers said to require one-tenth the memory needed in other file-transfer systems. The product can access printers, plotters, tape backup systems and other peripheral devices. Version 2.0 costs $139.95 for IBM PC compatibles and the Data General Corp. One Laptop. A special version for the Victor 9000 costs $199.

• An internal 9.6K bit/sec. V.32 modem card for the IBM PC is slated to be announced by Universal Data Systems. The Sync-Up V.32 promises full-duplex 9.6K bit/sec. operation through the use of an echo cancellation technique as well as a trellis-coded error-correction scheme. Both aysnchronous and synchronous autodialers are available, and the product includes built-in diagnostics and software-selectable configuration settings. Single-unit prices begin at $1,295.

• Triton Technologies, Inc. will announce Co/Session Version 3.0, which allows two PCs to work together as one or one PC to control another remotely. The list price for a two-user license is $249.

Check desk top for printers

ATLANTA — Desktop publishing capabilities are heating up the competition in the laser and impact printer fields. This year's Comdex/Spring '88 show, being held here next week, will showcase a slew of impact and nonimpact printers as well as image scanners.

• C. Itoh Electronics, Inc. will announce several additions to its current product line. Through a joint OEM agreement, Talaris Systems, Inc. and C. Itoh will offer Digital Equipment Corp. LNO3 emulation capabilities on C. Itoh's Megaserve ion-deposition printers. The nonimpact 30 and 45 page/min printers will be marketed directly against the DEC Printserver 40 and will be available in the fourth quarter. Prices will range from $21,995 to $29,995.

C. Itoh's 5 page/min Jet-Setter II laser printer offers Hewlett-Packard Co. Laserjet II emulation and improved font handling and manipulation. The product will include six resident fonts and cost $2,195, excluding options.

The Prowriter C-310 and the wide-carriage C-315XP 300 dot/in. matrix printers have been upgraded to include Epson America, Inc.'s FX-86E or FX-286E, respectively. Both products will offer IBM Proprinter XL emulation. The C-310 and the C-315XP will cost $699 and $899, respectively.

• Ricoh Corp. will introduce the RS320 desktop scanner, which will be targeted at desktop publishing, PC and facsimile communications, computer-aided design and optical character recognition (OCR). The flatbed model is said to be capable of scanning at resolutions ranging from 60 to 360 dot/in. The unit has a bidirectional Centronics Data Computer Corp. interface and will have a suggested retail price of $1,100.

• Chinon America, Inc.'s Information Equipment Division will introduce the Deskscan 2000 overhead image scanner. It will be available in three desktop publishing versions and will include an OCR configuration. It will also come with a new Chinon facsimile package, called Scanfax. Prices range from $659 to $995.

• Acer Technologies Corp.'s LP-76 will debut. The laser printer is an HP Laserjet II series compatible, prints 6 page/min and delivers up to 300 by 300 dot/in. graphics resolution with optional memory, the company said. The LP-76 will come standard with 512K bytes of memory, expandable to 4.5M bytes. The Acer LP-76 costs $2,000.

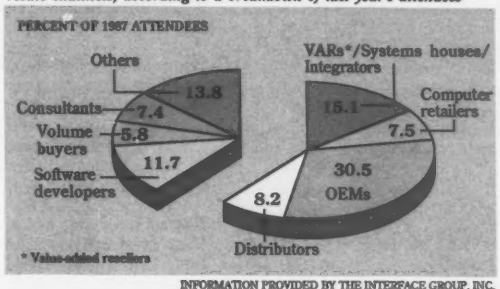
• Data Technology Corp. reconfigured its Crystalprint Series II page printer to include HP Laserjet II emulation. The Crystalprint Series II was designed for single-user desktop printing and high-resolution graphics applications. It prints at 6 page/min, features 300 by 300 dot/in. resolution and costs $1,999.

• Amstrad, Inc. will add three PC-compatible dot matrix printers to its product line. All three are industry standard, with dual parallel and serial interfaces.

The Amstrad, Inc. LQ5000DI 24-pin printer offers a 15-in. cartridge and prints at speeds of up to 289 char./sec. The LQ3500DI 24-pin printer will offer draft-quality output at 160 char./sec. and letter-quality text and graphics at 54 char./sec. A front-loading flatbed printer, the LQ3000DI, was designed specifically for labels, card stock and envelopes at speeds of up to 160 char./sec. Pricing information was not available.

Who'll be there

Comdex/Spring attendance is still dominated by those involved in resale channels, according to a breakdown of last year's attendees



INFORMATION PROVIDED BY THE INTERFACE GROUP, INC.
CW CHART

No need to look here for OS/2

ATLANTA — Users at next week's Comdex/Spring '88 will see plenty of DOS packages that will run in the compatibility box of IBM and Microsoft Corp.'s OS/2 but will be hard-pressed to find anything that is written specifically for the new operating system.

Most software vendors were tight-lipped last week about products they will be announcing at the show. Products scheduled to be introduced include the following:

• Toltran Ltd. in Barrington, Ill., is readying an artificial intelligence-based language translator and conversion software package for microcomputer users.

The Toltran System was designed so that vocabulary can be adapted to any specialized field, including the medicine, engineering, education, technical and military professions. Information is translated from English into a required language and back into English, and the developers maintain that words are analyzed singly and in context to determine the appropriate meaning.

The system runs on any dual-floppy IBM Personal Computer or compatible, and a version is slated to be available for Apple Computer, Inc. products. Pricing has not yet been made available.

• Micro Services, Inc. in Washington, D.C., will be introducing an add-on report writer for the Service Trac Productivity Management System. The report writer is said to allow users to export files to other data formats and to design their own custom reports.

The software runs under IBM's PC-DOS or Microsoft's MS-DOS and costs $1,295 for the single-user version. A network version is available for $2,595.

• Harvey is expected to announce two products for use with Hewlett-Packard Co. Laserjet and compatible printers. Hot Lead, a soft-font generator and editor, retails at a price of $195.

Harvey Type is a set of soft fonts that can be loaded on any HP or compatible laser printer. Both portrait and landscape orientations are provided. The package has a price tag of $149.95.

Comdex/Spring '88 product preview was reported by senior writer Alan J. Ryan and new products writer Sally Cusack.

Clone

FROM PAGE 1

additional, proprietary Microdirect I/O bus. Microdirect is currently negotiating with IBM for Micro Channel patent licenses, said Jon H. Hardie, chairman and chief executive officer.

"With the AT and the Micro Channel on the same motherboard, the user doesn't have to choose between the two," Hardie said. "This offers a bridge between existing and next-generation technologies, without sacrificing either one."

In addition to running Microsoft Corp. MS-DOS and OS/2, the Microdirect 386 I/O Express will offer two full-size Micro Channel add-in slots and six AT bus expansion slots. It will come standard with 16M bytes of random-access memory.

"It sounds like the ultimate clone," said Peter Tiege, an industry analyst at Dataquest, Inc. in San Jose, Calif. "It's a way of straddling both standards in one machine."

In addition to being the first micro to claim compatibility with both architectures, the Microdirect 386 I/O Express incorporates discrete semiconductor logic; other compatible vendors build systems around PC AT- or Micro Channel-compatible chip sets from vendors, such as Chips and Technologies, Inc.

Microdirect developed its own discrete logic because the company wanted to ensure full compatibility in the future with IBM's OS/2 Extended Edition, according to Hardie.

"We want to be as responsive to the market as we can, and discrete logic is much more flexible than chip sets," Hardie said. "We don't yet know what compatibility to OS/2 Extended Edition will be, so it seemed foolish to freeze an emerging technology into a chip set that might be off the mark."

IBM's own logic

IBM used the more expensive discrete logic in its PC line, then switched to custom circuitry for the PS/2 series as a way of competing on price with compatible makers, according to Andrew Rappaport, president of Technology Research Group, Inc., a consulting firm in Boston. The vast majority of compatible manufacturers, however, have stuck with using chip sets to keep system costs down.

Retail prices for the Microdirect 386 will begin around $6,000 and go up to $15,000 depending on the configuration, Hardie said. The firm is doing most of its own manufacturing.

Based on a 20-MHz 386, the Microdirect I/O Express bus handles only the I/O functions on the AT and Micro Channel pathways, upping throughput speed 10 times, Hardie said.

"The I/O on the PC today is the roadblock on the data freeway," Hardie said. "The CPU is fast now and capable of directly addressing CD-ROM, optical and 760M-byte hard disks in real time as random-access memory, but the I/O can only access them at about 512K byte/sec." Microdirect's proprietary I/O bus, Hardie said, offers I/O access at 5M byte/sec. via the use of a small computer systems interface.

It is unclear how users will react to a split-personality microcomputer, analysts said, especially if it does not offer strong price advantages over IBM.

"It sounds like a nice idea, but I don't really see the need for a PC with both the AT and Micro Channel bus," said Phillip Gordon, manager of office systems at Charles Schwab & Co. in San Francisco.

The Microdirect 386 comes standard with the Intel 80387 and Weitek Corp. 1167 coprocessors and interleaved memory. The system was designed to run with the 25-MHz 386 and can be upgraded by switching the CPU, Hardie said.

Second-class postage paid at Framingham, Mass., and additional mailing offices.
Computerworld (ISSN 0010-4841) is published weekly, except: (6) issues in February, May, August and October, (5) issues in January, March, April, June, July, September and November and (4) issues in December with a single combined issue for the last week in December and the first week in January of 1989 by CW Publishing/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171.
Copyright 1988 by CW Publishing/Inc. All rights reserved.
Computerworld can be purchased on 35 mm microfilm through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, Mich. 48106. *Computerworld* is indexed: write to Circulation Dept. for subscription information.
Photocopy rights: permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CW Publishing/Inc. for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 21 Congress Street, Salem, Mass. 01970.
Permission to photocopy does not extend to contributed articles followed by this symbol. ‡
Special requests for reprints and permission should be addressed to Nancy M. Shannon, CW Publishing/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171. Subscriptions call toll free (800) 255-6286 or in New Jersey call (800) 322-6286.
Requests for missing issues will be honored only if received within 60 days of issue date. Back issues, if available, are charged at $2.00 per issue, plus postage.
Subscription rates: $2.00 a copy: U.S. — $44 a year; Canada, Central & So. America — $110 a year; Europe — $165 a year; all other countries — $245 a year (airmail service). Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin.

MPA ABC ABP BPA

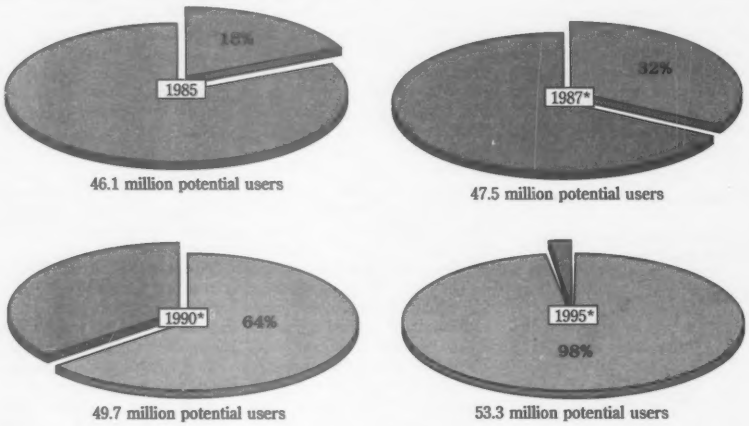
POSTMASTER: Send Form 3579 (Change of Address) to *Computerworld*, Circulation Department, P.O. Box 1566, Neptune, NJ 07754-1566.

TRENDS

Electronic mail

By 1995, business use could approach the saturation point

ACTUAL USERS AS PERCENT OF POTENTIAL USERS



*Estimated

The number of people using electronic mail as a business tool will continue to grow at a rate of about 30% a year for the rest of the decade, according to "Electronic Mail & Micro Systems," published by International Resource Development, Inc. in New Canaan, Conn.

But only four of every 10 workers will have a real business need on the job for telex, facsimile, voice mail or any other computer-based messaging system, according to the newsletter's editor, Eric Arnum.

Based on recent U.S Department of Commerce statistics covering population and employment, Arnum estimates that only 46.1 million of the 107.1 million workers counted in 1985 are ever likely to use electronic mail on the job.

By 1995, assuming employment continues to grow, he predicts that about 44% of an estimated 122 million workers will use E-mail.

The newsletter also took a look at the use of various types of electronic messaging systems. Computer-based messaging systems, the most popular method today, will probably lose favor by 1995, dropping to third place.

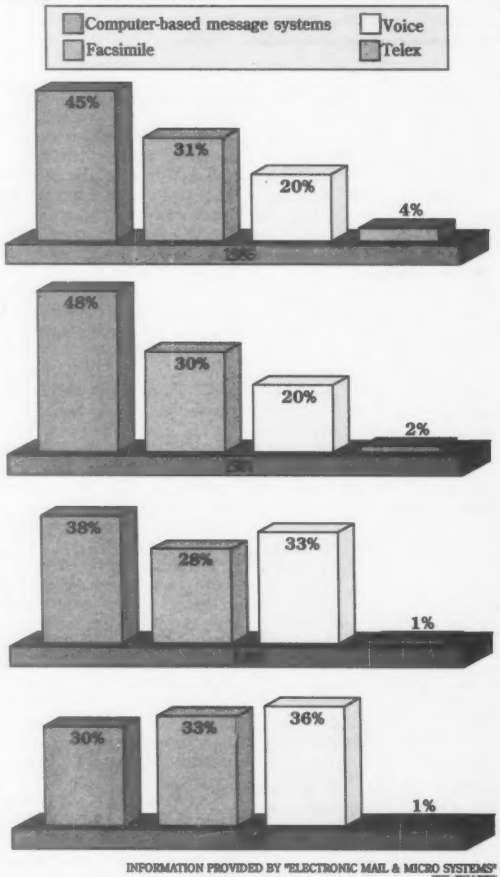
The 4.5 million facsimile users in 1987 could easily jump to 17 million by 1995, the newsletter claimed. Facsimile use is expected to pull ahead of telex and voice mail for a period, losing out to voice mail by 1990.

The voice mail market is expected to remain in the several-million-user range.

PATRICIA KEEFE

Users' media preferences should shift

PERCENT OF USE BY MEDIA TYPE



INFORMATION PROVIDED BY "ELECTRONIC MAIL & MICRO SYSTEMS"
CW CHARTS

INSIDE LINES

Step right up . . . Amdahl's three-ring circus is set for tomorrow. "In the center ring, we have a water-cooled CPU capable of 45 million instructions per second! Behind the juggling elephants awaits a universal controller ready for its own disk toss! And finally, below the trapeze artists, a humming box looking like a smaller version of IBM's 3380 J and K direct-access storage devices!" The company may not have its own big top, but that's what sources say the closely guarded Amdahl product rollout is expected to look like when the company finally lifts the canvas off its products Tuesday.

Prerelease me, let me code. Lotus's 1-2-3 Release 3 may not ship until the end of this year, but that will not stop third parties from preannouncing add-ons. At a press conference hosted by Lotus today, a number of third parties are expected to explain their planned wares, which were written using Leaf, a proprietary Lotus language that gives programs broader access to 1-2-3. And for those of you who are still confused about why Lotus is introducing a new language, the company will explain the benefits, in addition to the details.

What did Fred tell the doctor, and when did he tell him? Wang has notified selected users that it will phase out its slow-selling Professional Computer, Advanced Professional Computer and Professional Image Computer. Wang will no longer sell the three micros as stand-alone systems after June 30; they will only be available as workstations in a larger system configuration.

Way to go, Ollie! In the 14 days following Col. Oliver North's testimony on his role in the Iran-Contra hearings, IBM received its largest number of orders ever for its Professional Office System, or Profs, according to Paul Hessinger, chief technical officer at Computer Task Group in Buffalo, N.Y. Profs played a role in the hearing when it was revealed that the office automation system had created copies of North's communications even while he attempted to shred the paper trail that led to his door.

Cleaning their Windows. Microsoft will announce a version of its Windows operating environment this month, sources close to the company said last week. The software will not support Intel 8088-based personal computers and will be designed to work primarily with Intel 80286-based machines. Sources said the Windows upgrade will feature a variety of new drivers, including one for the 8514 graphics chip, and enhancements for existing drivers. The new version also has a memory management scheme to better accommodate large-memory applications. Apple Computer's attempts to block the sale of Windows apparently won't slow the new package's release.

Reds on the bleeding edge. Our mole in the Kremlin tells us that not only does IBM have an office in the city of golden onion domes, but sales reps there are busily taking orders — just for Personal System/2s. Old technology just will not do for Soviet users. Actually, we're probably talking back orders, since the PS/2 may not yet be approved for shipment behind the Iron Curtain.

Although Cullinet sources dismissed it as a continually occurring rumor, the CW hot line's hottest source on that company's shake-ups of the past two months insists that $5 prevented the company from being acquired by Computer Associates. The source, who's batted 1.000 on recent management departures, says Cullinet wanted $15 a share to sell out, but Computer Associates could only justify spending $10 per share because of the expense to be incurred in paying off golden parachutes and other compensation provisions that stretch far deeper into the company than usual. Computer Associates declined to confirm or deny such a bid, but the source said Computer Associates wants to make an acquisition quickly, and Cullinet is one of three candidates. Is J. R. Ewing behind it all? Will Bobby wake up in the shower? Is Pam hiding out in the Cullinet tower? Call the hot line at 800-3430-6474, or 617-879-0700, and help News Editor Pete Bartolik unravel those cliff-hangers.

THE NEW SUN WORKSTATION IS ALREADY POSTING SOME IMPRESSIVE NUMBERS.

On April 7, Sun Microsystems* introduced the world's first workstation that uses the full power of the Intel386™ computing engine.

The Sun386i.*

Already, it's a candidate for new product of the year. And no wonder.

The 386™ microprocessor was specifically designed to support workstations like this. With its advanced architecture, the 386 chip lets the Sun system run UNIX* and DOS applications at the same time. At full speed.

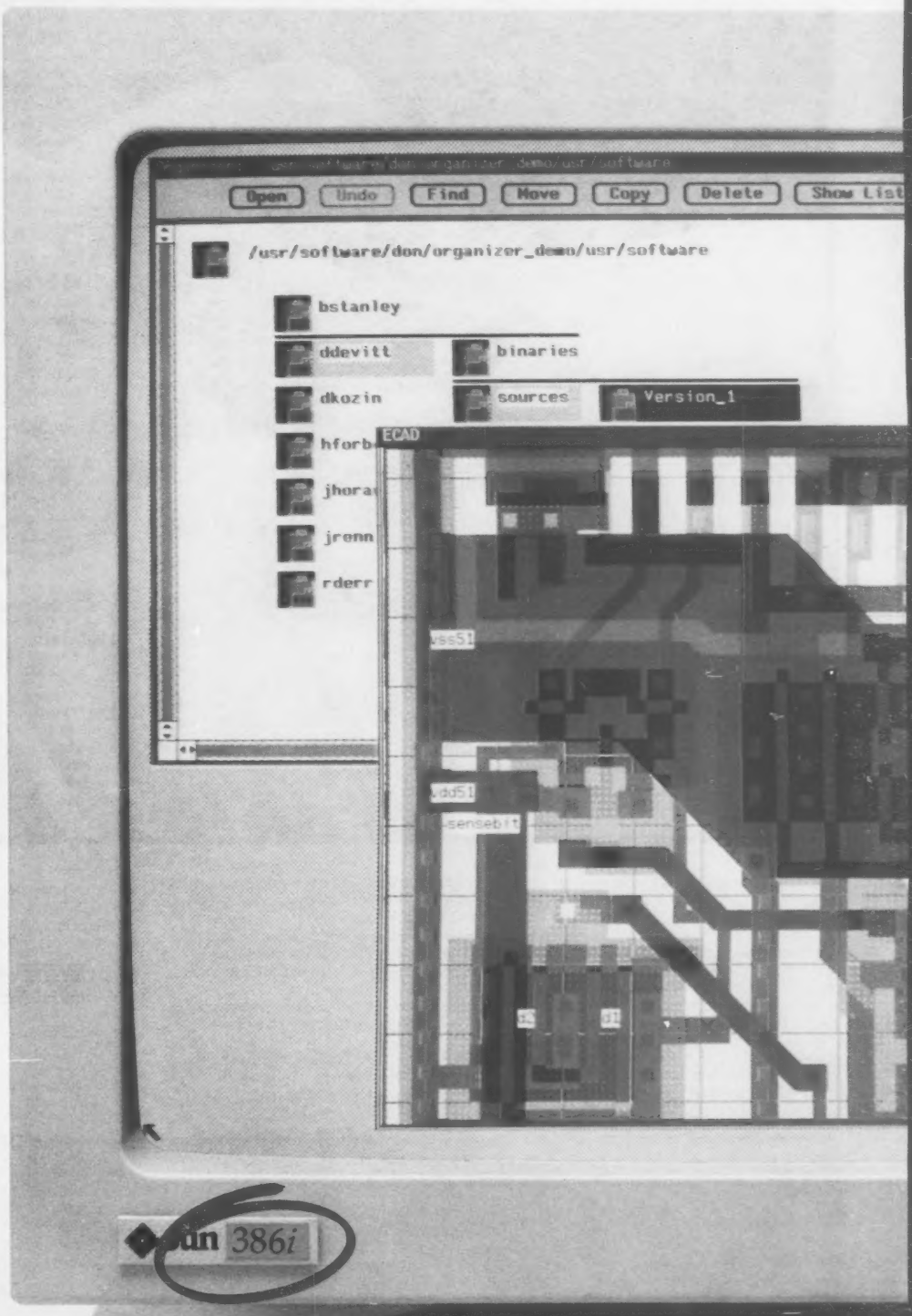
And we mean full speed. The Sun386i can run at 13,000 Dhrystones/second. Besides our 386 chip, Sun gave its workstation the full performance boost delivered by the complete Intel386™ computing engine: the 387 numerics coprocessor, 385 cache memory controller, and 380 direct memory access chip. The result is almost twice the performance of Sun's previous workstations.

Of course, the business benefits that Sun's workstation delivers are just as impressive. It lets users take advantage of applications running under SunOS as well as thousands of other standard UNIX and DOS software programs. As a result, Sun can offer its customers all the benefits of cutting-edge technology. With none of the risk.

So if you'd like to know how the 386 microprocessor can make the performance of your next design even more impressive, just call (800) 548-4725 and ask for Literature Dept. W447.

And we'll help you get the full power out of our Intel386™ architecture. By showing you how much we've put into it.

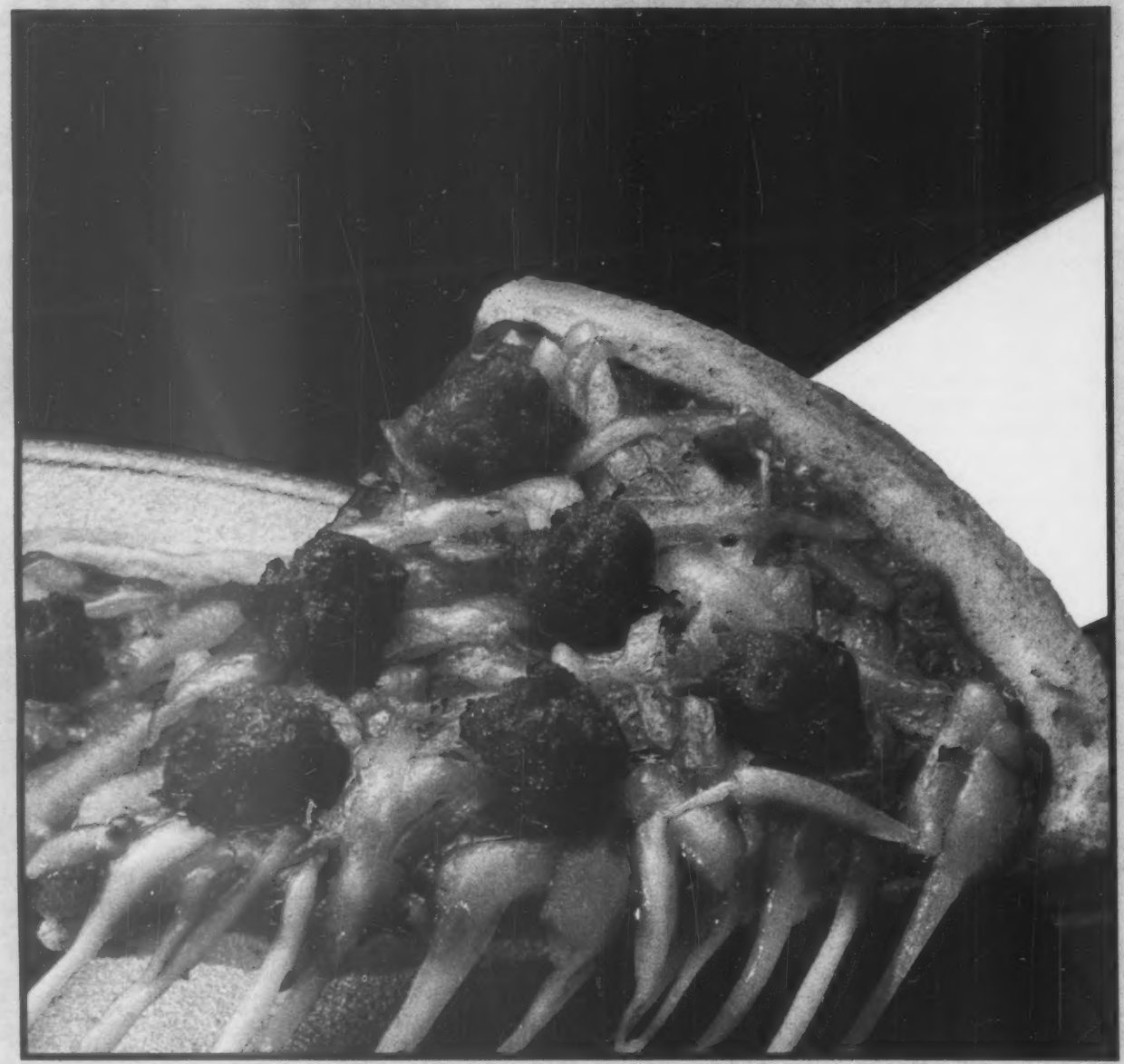
intel®



*Sun Microsystems is a registered trademark and Sun386i is a trademark of Sun Microsystems, Inc.; 386 and Intel 386 are trademarks of Intel; *UNIX is a registered trademark of AT&T Bell Laboratories.

©1988 Intel Corporation.

WE HELP PILLSBURY SLICE PRODUCTION TIME.



Based in Minneapolis, The Pillsbury Company is a diversified, international food company with a well-respected name and a distinct corporate goal: to be the best food company in the world. To achieve that goal, Pillsbury's production must respond quickly to the demands of a rapidly changing market. AMAPS software from Management Science America, Inc. helps them do that for their Totino's® brand pizzas.

"We were first attracted to AMAPS by the caliber of companies we found using the software," said Carl Wilson, Vice President of MIS for Pillsbury's U.S. Foods Division. "AMAPS had the flexibility and functionality we needed to run our plants. It also had the technological capability to interface into our overall computer-integrated manufacturing strategy."

With AMAPS, Pillsbury has achieved improvements in overall inventory reduction, management reporting, production flexibility and plant-corporate communications. Most importantly, the system has enabled Pillsbury to be more responsive to market changes.

According to Jim Shadkz, Vice President-Operations, "Our information strategy is integral to our plan to be the best food company in the world. We have the systems in place now to help us achieve that."

To find out how MSA can keep your company rolling along smoothly, call Robert Carpenter at (404) 239-2000.

MSA The Software Company

©1987 Management Science America, Inc. Totino's® is a registered trademark of The Pillsbury Company.